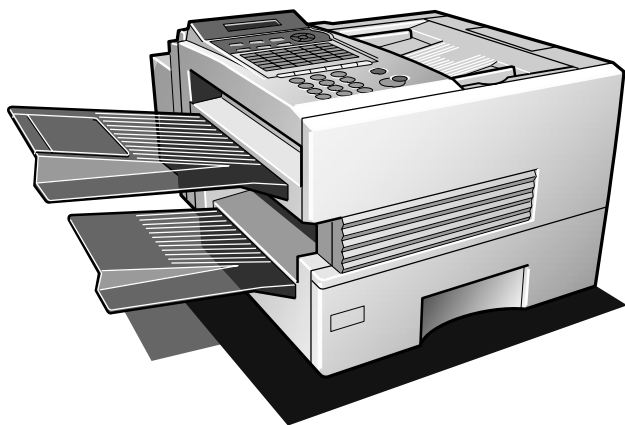


Service Manual

Facsimile

DX-2000



IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by \triangle in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

Panasonic®

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1 General Description

1.1 Overview

This section covers the features and specifications of the plain paper facsimile transceiver "Panasonic DX-2000". This fax machine can transmit and receive on the Public Switched Telephone Network (PSTN) in modes conforming to ITU-T Group 3 recommendations. This fax machine can also transmit and receive an email with SMTP / MIME Protocol and receive an email with POP3 Protocol.

1.2 General Features and Functions

1. Laser Printing

Clear picture quality is obtained by employing a Laser printing method on plain paper. The machine can print onto A4, Letter or Legal size paper.

2. Quick Scan

Quick Scan speeds the fax process by scanning and storing documents into memory at a rate of approximately 1 second* per page. This means that you no longer have to wait around until a transmission is completed before retrieving your originals. (*Standard Resolution, based on ITU-T Image No. 1 Test Chart. The Scanning speed applies only to the feeding process from the leading to the lagging edge of a single page test chart. The time it takes to store the document into memory is not applied for this definition)

3. Easy Maintenance

This laser printing mechanism only requires changing the toner cartridge, housing the drum and toner.

Unlike other machines with removable EPROM (Erasable Programmable ROM), this machine is equipped with a F-ROM (Flash ROM). F-ROM offers the flexibility of quick and easy firmware updates, creation of a master firmware card, backup and restore of firmware and machine parameters.

4. Panasonic Super Smoothing

The machine incorporates a new sophisticated image processing technology to enhance print quality of ordinary received fax images by smoothing the curved edges of the character.

5. B4 size Scanning

B4 size is the maximum document width that can be scanned and transmitted.

(Note: 11 inches is the maximum document width that can be loaded into the ADF, however only B4 width will be scanned.)

6. Automatic Document Feeder

An Automatic Document Feeder feeds originals from the document tray automatically, starting with the bottom page.

Capacity: 50 documents of average thickness and of the same size.

7. Speedy Transmission

The use of JBIG Coding with ECM achieves faster transmissions. Short Protocol reduces handshake time by shortening Phase B and D.

8. Error Correction Mode (ECM)

An Error Correction Mode, which conforms to ITU-T Recommendations, allows error-free data transmission. ECM with MMR or JBIG Coding also conforms to ITU-T Recommendations.

9. Automatic Dialing Function

Up to 200 stations can be easily dialed by One-Touch Dialing or Abbreviated Dialing Function. Any other stations can be dialed directly from the keypad by entering the full telephone number or an email address (up to 70 stations).

10. Memory Transmission

The contents of a document can be stored into the document memory first, then transmitted from memory. Operator attendance until transmission ends is not necessary.

11. Multi-station Transmission

Using the document memory, the document(s) can be stored and transmitted to mixed destinations, PSTN and LAN (up to 270 stations).

12. Multi-file Transmission

It is possible to store multiple documents, each of which could be transmitted to different destinations, into the document memory. Then the unit will transmit them sequentially (70 files maximum).

13. Substitute Reception

The contents of a document will be received into the document memory if the recording paper or toner runs out, or a recording paper jam occurs during reception. The stored documents can be printed after replacing the recording paper or toner cartridge or correcting a paper jam.

14. Multiple Operation

Multiple Access operations can store documents and their destinations even during reception or memory transmission. It can also receive during document storage. The DX-2000's dual port capability, allows simultaneous G3 Fax and LAN operations.

15. Halftone (Photo)

For transmission or copying, this function ensures high quality reproduction of gray-shaded or photographic documents. This machine uses 64 levels of error diffusion to create halftones with Quality mode.

16. Copy Function

The Copy function allows the machine to be used as a copier. Using the document memory, up to 99 copies can be made of a single original.

17. 100 Transaction Journal

The 100 Transaction Journal provides transaction information - number of pages transmitted or received, start date and time, communication results, identification, etc. It is automatically printed after every 100 transactions, or it can be printed manually at anytime.

18. Dual Port Communication

The DX-2000's dual port capability, allows simultaneous G3 Fax Communication over regular telephone lines (PSTN) and LAN Communication.

19. Communication Journal

A communication journal is a result report of a communication which can be printed automatically after communication is completed. Printout conditions can be selected for each communication to 1) not print, 2) always print, or 3) print when communication has failed.

20. Multi-purpose LCD Display

The 20 x 2 Alphanumeric LCD display shows the operation mode, date and time, remote ID number, and pages transmitted or received. In case of an error, the LCD display shows an information code and error message indicating the exact cause of trouble.

21. Verification Stamp

The Verification Stamp is automatically stamped on the original document when the document is transmitted or stored in memory successfully. The "X" mark appears at the bottom of each page.

22. Remote Diagnostic Function

The remote Diagnostic Function can be used to diagnose the unit remotely over the PSTN or equivalent. A new host system is required for high speed remote diagnostics to be available.

23. Check and Call Function

This feature enables the Authorized Servicing Dealers to manage and improve the Fax machine maintenance to their customers by alerting them of equipment problems. It also can be used as a Supply Sales Tool by alerting the Dealer that the unit is running Low on Toner. The function overview is as follows:

- a. The machine's printer error information is stored in the Printer Report.
- b. The printer report can be manually printed when required.
- c. When printer errors occur, the unit can automatically transmit the Service Alert Report to the pre-registered telephone number or email address.
- d. When the unit detects Low Toner, it can automatically transmit the Maintenance Alert Report to the pre-registered telephone number or email address.
- e. When the unit detects Low Toner, it can automatically print the Toner Order Form with pre-registered order information.

24. Sender Selection (PSTN/Internet Communication Feature)

This feature allows the user to select one of the 25 preset User Names and email Addresses before each Transmission. The selected User Name is printed on the Header of each page sent and on the COMM. Journal. When sending email, the selected User Name and/or email Address appears in the "From" field of the email message.

25. Internet FAX Transmission (Internet Communication Feature)

This function allows you to transmit documents over the Internet to another Internet FAX or a PC. Using a simple operation, documents can be transmitted to an email address destination as a TIFF-F attached file to an email (using MIME encoding). The receiving end of the email system must support MIME encoding, otherwise the TIFF-F file attachment will be detached and lost.

26. Internet Email Reception (Internet Communication Feature)

POP3 and SMTP Protocol are available to receive an email. In POP3 Protocol, the unit allows you to login into the POP Server in order to retrieve email by using the programmed POP timer or by simply pressing the START key. In SMTP Protocol, the unit allows you to receive and print email automatically. However, if the received email includes file attachments in a format other than TIFF-F (i.e. MS Word, Excel, Power Point, etc), the unit will print the body text of the email and print the following Error Message:

```
*****
*
*   This email has an attached file which is not supported by Internet FAX.
*
*   Inform the originator to re-send the attachment in the TIFF-F file format.
*
*   You can download a TIFF-F Converter (Windows Print Driver) from the
*   following URL addresses:
*
*   http://www.panasonic.co.jp/mgcs/internetfax/
*   http://www.panasonic.com/internetfax
*
*****
```

27. Network Scanner (Internet Communication Feature)

The unit can be utilized as a network scanner by scanning the image and sending it to the PC via email as an attachment. This feature was enhanced with an addition of a new Fax Parameter No. 164 (IFAX XMT HEADER), giving you a selection of whether to include the header when sending a document to an addressee in the same Domain as specified in the Default Domain parameter.

(Note: When sending to a Domain other than as specified in the Default Domain parameter, the header will be included regardless of the selection.)

28. Network Printer (Internet Communication Feature)

The unit can be used as a network printer. Documents created by personal computer applications can be sent from a PC connected to the LAN, and printed at the Internet FAX. To use the network printer function, it is necessary to download the software from the Panasonic home page and install it on the PC.

29. Fax Forward (G3/Internet Communication Feature)

This feature allows all incoming faxes or emails to be forwarded to the station registered in the one-touch or abbreviated dialing number. Once the faxes or emails are received in the memory, the machine will forward the received document(s) to the telephone number or the email address registered in the one-touch or abbreviated dialing number. This function is convenient when you would like to receive faxes or emails at another place (i.e. your home) at night or during a holiday.

30. Inbound Routing (Internet Communication Feature)

The DX-2000 can route documents received from a G3 fax machine to an email address(es) or to Internet Fax machine(s) connected to LAN as an email, as well as to other G3 fax machine(s) over the telephone line. It can also perform a sub-address and TSI query within its auto dialer and route the received document(s) to the one-touch and/or abbreviated number stations matching the specified sub-address or the sending machine's TSI.

31. Multi-station Transmission (Internet Communication Feature)

Documents or email can be transmitted to a maximum of 270 destinations simultaneously.

To simplify entering multiple locations and be able to send to an unlimited number of email addresses with one easy operation, you can use a Mailing List stored in the Mail Server. Ask your Network System Administrator on how to utilize a Mailing List.

32. Internet Relayed Transmission (G3 Gateway Function / SMTP Protocol)

This feature can save you time and transmission costs by allowing you to send the same documents or email from a DX-2000, DX-1000 or from a PC to another DX-2000 or DX-1000 over the Internet to be relayed to multiple G3 machines at the same time.

The Relay XMT Password, the Manager's email Address and the Domain Name(s) must be registered for the Internet FAX to work as a Relay Station.

(Note: To prevent unauthorized stations from accessing your Relay Station for Internet Relayed Transmission, you must set up your network security. Enter a Relay XMT Password which is concealed from the final destinations and a Manager's email Address for notification of all Internet Relayed Transmissions.)

33. LAN Relay Journal (COMM. Journal)

A result report of a Internet Relayed Transmission which is sent from the Relaying Internet FAX back to the sender after the transmission is completed. The notification condition can be selected with the setting of Fax Parameter No. 143 (RELAY XMT REPORT) to 1: Off (Don't send), 2: Always (Always send) or 3: Inc. Only (Send only if communication has failed).

34. PC Remote Update

This feature was renamed and enhanced to provide a convenient and easy way of programming, updating, retrieving for backup and restoring the Internet Parameters, One-Touch, Abbreviated Dialing Numbers and Program keys right from your PC by sending a text email message to the DX-2000.

35. Internet Fax Return Receipt

After a Panasonic Internet Fax is received, a Internet Fax Return Receipt is returned to the sender, with a portion of the received document attached in graphic form. No Internet Fax Return Receipt is returned for email received from a PC.

36. "Subject" Line

A subject line of up to 40 characters can be entered before sending an email.

37. Access Code

The Access Code can be registered into the machine to prevent operation by an unauthorized user.

This feature was enhanced to restrict access to All functions of the machine or just the Fax Parameters and User Parameters only.

38. 400 dpi Resolution

The 400 dpi resolution is available for LAN Communication and Copy Mode only. When communicating in G3 mode, the resolution will automatically adjust to the highest resolution capable at the receiving fax machine. Documents stored in 400 dpi resolution are optically scanned in at 200 dpi and enhanced to 400 dpi image quality by interpolation technology.

1.3 General Specifications

1. Communication Facility

Public Switched Telephone Network (PSTN)

Local Area Network (LAN) Ethernet/IEEE 802.3 Physical Interface; RJ-45 (10Base-T)

2. Line Coupling

Direct Coupling

3. Input Level

-5 to -43 dbm (Germany : -5 to -46 dbm)

4. Output Level

0 to -15 dbm

5. Control Procedure

PSTN	:	ITU-T Rec.T.30
		MGCS Proprietary short protocol
LAN	:	TCP/IP
		SMTP/POP3/MIME

6. Modem Speed

V34	:	33600 - 2400 bps @2400 step (QAM with TCM)
V.17	:	14400, 12000, TC9600, TC7200 bps (QAM with TCM)
V.33	:	14400, 12000 bps (QAM with TCM)
V.29	:	9600, 7200 bps (QAM)
V.27ter	:	4800, 2400 bps (PhM)

7. Coding Scheme

MH (Modified Huffman)	:	PSTN/LAN
MR (Modified Read)	:	PSTN only
MMR (Modified Modified Read)	:	PSTN/LAN (400 dpi scanning only)
JBIG (Joint Bi-level Experts Group)	:	PSTN only

8. Communication Resolution

<Transmission>

Standard	:	203 dpi x 98 lpi (8 pels/mm x 3.85 lines/mm)
Fine	:	203 dpi x 196 lpi (8 pels/mm x 7.70 lines/mm)
400 dpi	:	203 dpi x 391 lpi (8 pels/mm x 15.4 lines/mm) 406 dpi x 391 lpi (16 pels/mm x 15.4 lines/mm)

<Reception>

Standard	:	203 dpi x 98 lpi (8 pels/mm x 3.85 lines/mm)
Fine	:	203 dpi x 196 lpi (8 pels/mm x 7.70 lines/mm)
400 dpi	:	203 dpi x 391 lpi (8 pels/mm x 15.4 lines/mm) 406 dpi x 391 lpi (16 pels/mm x 15.4 lines/mm)

9. Halftone (Photo)

64 Levels, Error Diffusion

10. Error Correction Mode

ITU-T Rec. T.30 ECM

11. Image Memory Capacity

(Flash Memory)

Standard (Base)	:	120 pages
Option (Additional)	:	+80 pages (1 MB byte : UE-410045) +160 pages (2 MB byte : UE-410046) +320 pages (4 MB byte : UE-410047) +640 pages (8 MB byte : UE-410048)
(using ITU-T Image No.1 in Standard Resolution)		

12. Transmission Speed

3 Seconds using ITU-T Image No. 1 in Standard Resolution, memory to memory communication.

13. Automatic Dialing

Dialing Signal	:	10 PPS/20 PPS/DTMF
Dialing Method		
One-Touch Dialing	:	Up to 40 keys (including 8 programmable keys)
Abbreviated Dialing	:	Up to 160 stations
Manual Number Dialing	:	Up to 70 stations
(Direct Dialing)		(Up to 36 digits including pauses : PSTN) (Up to 60 characters : LAN)
Programmable Dialing	:	Up to 8 programmable keys
Combination Dialing	:	Combination of One-Touch, Abbreviated and Manual Number Dialing
Multi-Station Dialing	:	Multi-Station Transmission/Polling [Up to 270 stations]
Registration Memory Capacity in One-Touch and Abbreviated Dialing		
Number of Stations	:	Up to 200 stations
Telephone number of each station (PSTN)	:	Up to 36 digits (Including pauses and spaces)
Email Address of each station (LAN)	:	Up to 60 characters
Station name for each station	:	Up to 15 characters
Redialing		
Automatic	:	Up to 15 times with 0 to 15 minute intervals (PSTN only)
Manual	:	By pressing the Redial button (last number dialed for PSTN only)

14. Gateway User Parameters

Domain Name	:	Up to 30 characters
Acceptable Domain Name(s) for Relay Transmission	:	Up to 10 domains
Relay XMT Password	:	Up to 10 characters


15. Print Reduction Ratio

A4 / Letter	:	70 to 100% in 1% steps
Legal	:	85 to 100% in 1% steps (according to the received document length)

16. Clock Backup Battery

This unit uses a Lithium battery to backup the clock and calendar.

The service life is approximately 1 year when the power to the machine is turned "Off".

 **CAUTION** denotes hazards that could result in minor injury or damage to the machine.

- THIS PRODUCT CONTAINS A LITHIUM BATTERY. DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED.
- REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS OF YOUR LOCAL SOLID WASTE OFFICIALS.

(Note: This battery is not installed in the new unit, it is packaged with the accessories.)

1.4 Scanner Specifications

1. Document Dimensions

Width	:	Minimum 148 mm Maximum 280 mm
Length	:	Minimum 128 mm Maximum 356 mm

(Note: With operator's assistance, a maximum of 2000 mm length document can be sent (one page at a time) through the ADF.

2. Automatic Document Feeder

The Automatic Document Feeder feeds the originals from the document tray automatically, starting with the bottom page.

Paper thickness	:	Single-page	: 0.06 to 0.15 mm
	:	Multi-page	: 0.06 to 0.12 mm
Capacity	:	20 documents (Legal Size - 20 lb)	
	:	50 documents (Letter / A4 Size - 20 lb)	

3. Scanning Method

Horizontal	:	Sheet Feeding with CCD type image sensor
Vertical	:	Stepper Motor feeding

4. Effective Scanning Width : 252 mm

5. Scanning Resolution

Standard	:	203 dpi x 98 lpi (8 pels/mm x 3.85 lines/mm)
Fine	:	203 dpi x 196 lpi (8 pels/mm x 7.7 lines/mm)
400 dpi	:	203 dpi x 391 lpi (8 pels/mm x 15.4 lines/mm)
	:	406 dpi x 391 lpi (16 pels/mm x 15.4 lines/mm) (Interpolated)
Copy	:	406 dpi x 391 lpi (16 pels/mm x 15.4 lines/mm) (Interpolated)

6. Contrast Selection

3 steps (Normal / Lighter / Darker)

1.5. Printer Specifications

1. Recording Paper Size (W x L)

Letter	:	216 x 279 mm
Legal	:	216 x 356 mm
A4	:	210 x 297 mm

2. Recommended Recording Paper Weight

60 to 90 g/m²

3. Paper Capacity with standard cassette

500 sheets (75g/m²)

4. Printing Resolution

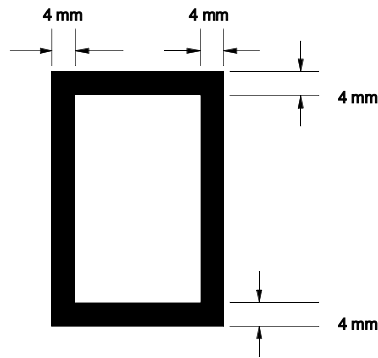
406 x 391 dpi (Fax or Copy)

600 x 600 dpi (Printer)

(Note: Page Memory (D-RAM) card is required for 600 dpi printing)

5. Non Printable Margin

The shaded areas represent the unprintable area on the recording paper.



6. Printing Speed

10 ppm (6 seconds/page)

7. Fuser Warm Up Time

Within 70 seconds after turning the power on.

[Room Temperature: 20 to 35°C]

[Power Voltage: Minimum 115 V]

1.6 Power

1. Power Requirement

90~138 VAC, 47~63Hz, Single Phase (100V Version)

180~264VAC, 47~63Hz, Single Phase (200V Version)

2. Power Consumption

Maximum	:	Approx. 470 W
Reception	:	Approx. 460 W
Copy	:	Approx. 470 W
Transmission	:	Approx. 23 W
Standby (Energy-Saver Mode: On)	:	Approx. 14 W/H
Standby (Energy-Saver Mode: Off)	:	Approx. 82 W/H
[Room temperature: 25°C]		

1.7. Environment

1. Operating Environment

Temperature	:	10 to 35°C
Relative Humidity	:	15 to 70% RH
Tilt	:	The unit must be kept on an even, level surface.

2. Storage Environment (Carton Box Condition)

Temperature	:	-20 to 40°C
Relative Humidity	:	5 to 85% RH

(Note: The machine should be stored upright.)

3. Transportation Environment (Max. 480 hours, Carton Box Condition)

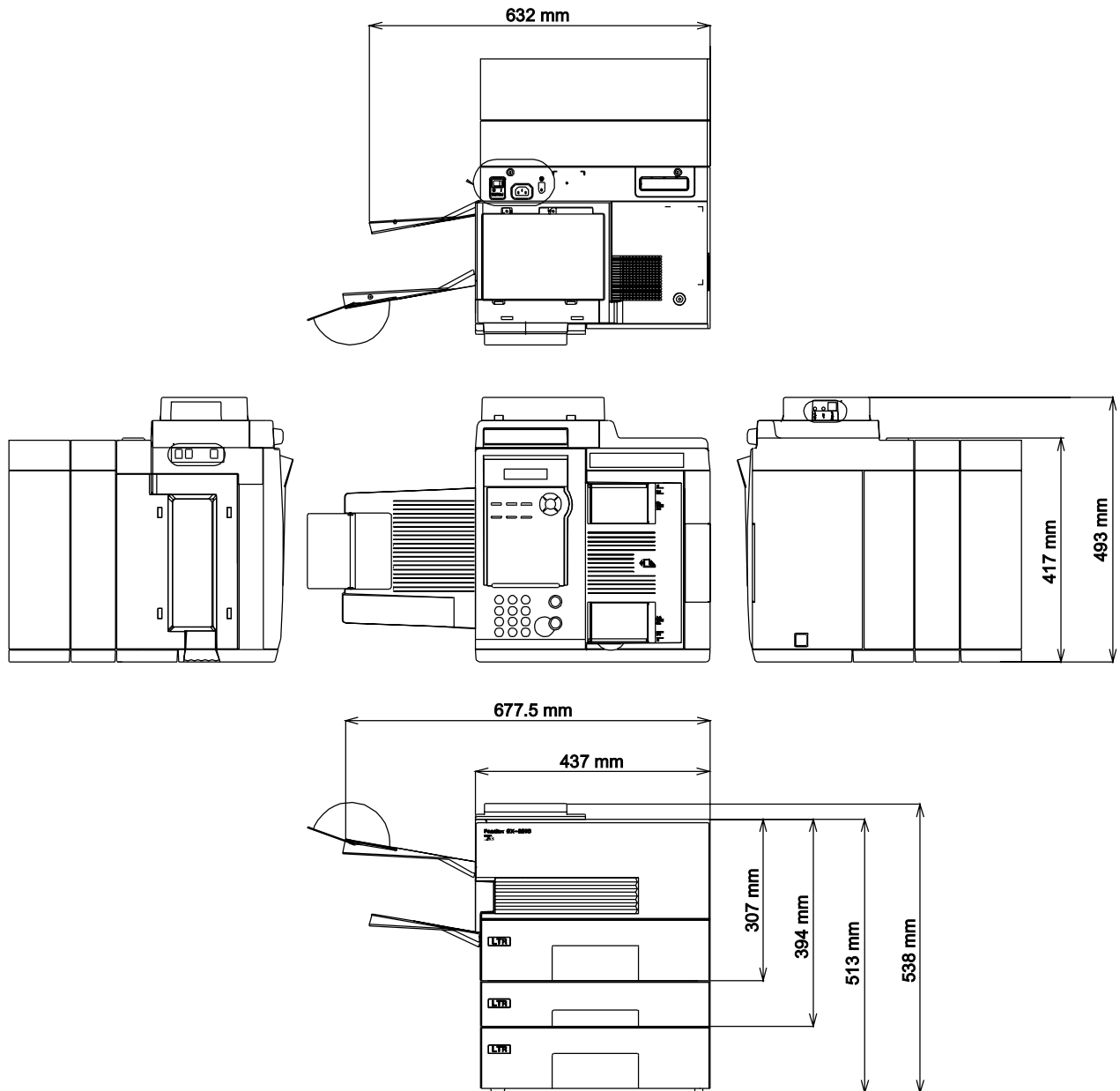
Temperature	:	-20 to 50°C
Relative Humidity	:	15 to 85% RH

1.8. Construction

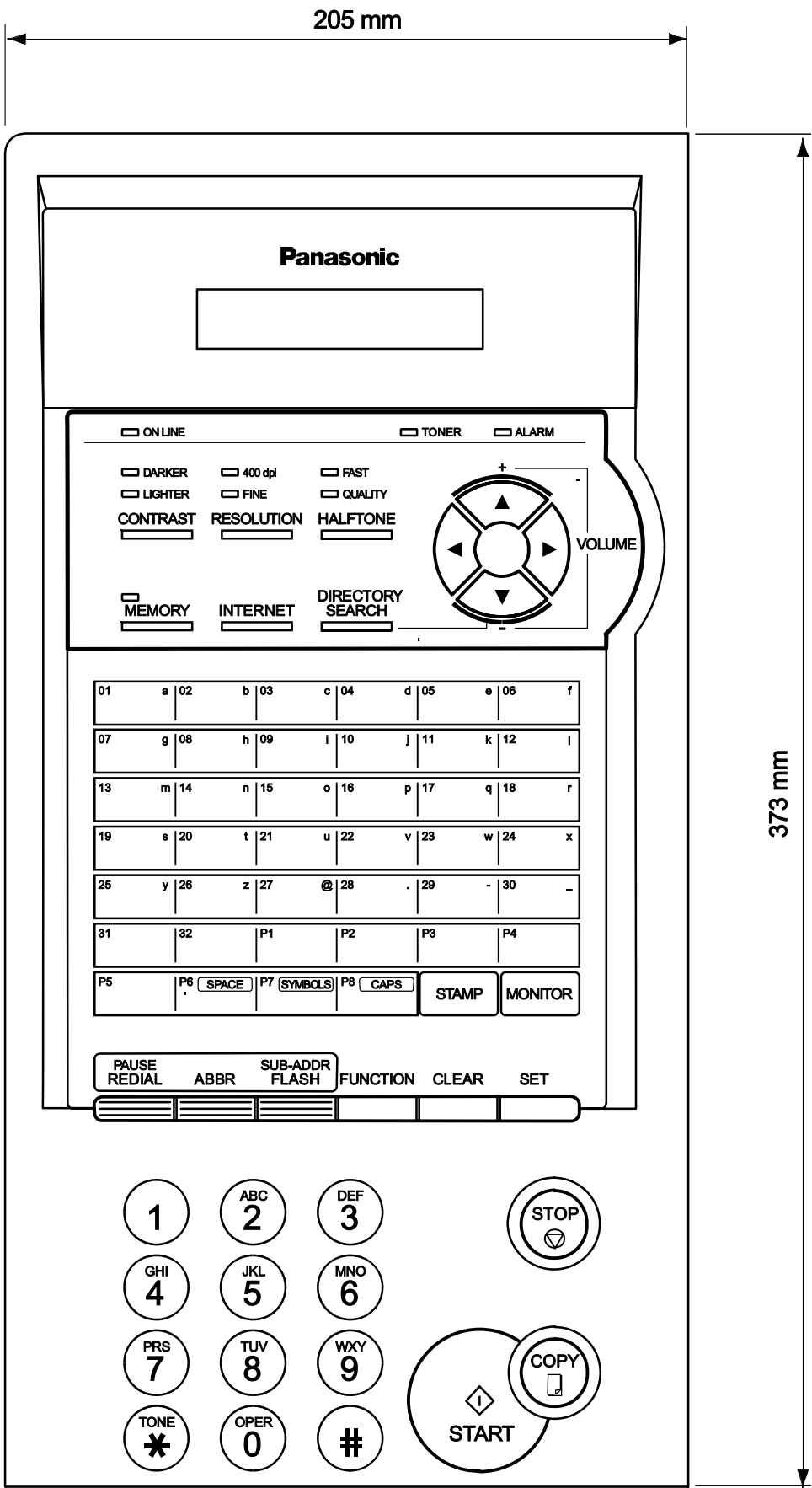
Dimensions (W x D x H)
Weight (excluding paper)

437 x 493 x 307 mm
Approximately 17 Kg

1.8.1. External View



1.8.2 Control Panel

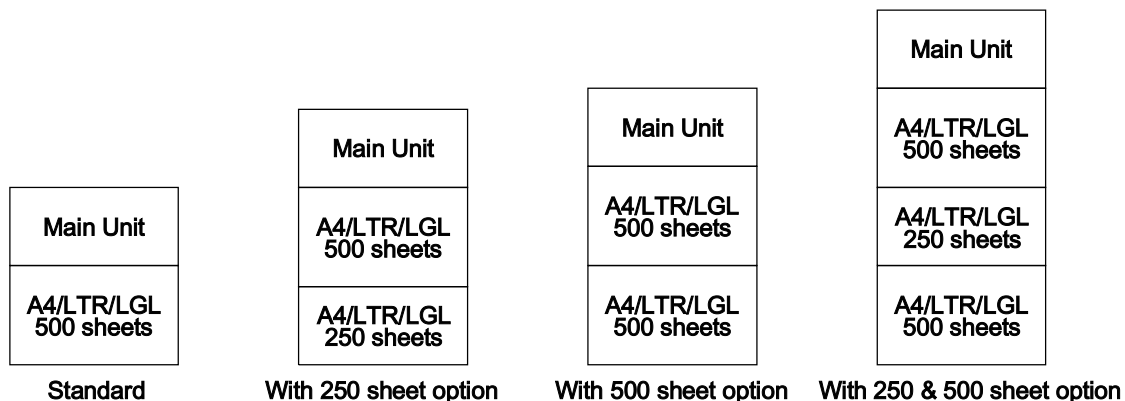


1.9. Specification Table

Items	DX-2000		DX-1000	
	PSTN	LAN	PSTN	LAN
Main Specification				
Compatibility	G3	TCP/IP SMTP/POP3 MIME	G3	TCP/IP SMTP/POP3 MIME
Modem Speed (kbps)	33.6 - 2.4	-	14.4/12/9.6/7.2/4.8/ 2.4	-
Coding Scheme	MH/MR/MMR/JBIG	MH/MMR	MH/MR/MMR	MH/MMR
ECM (Conforms to ITU-T)	Yes (MMR/JBIG)	-	Yes	-
MWS	No	-	No	-
Short Protocol	Yes (B, D)	-	Yes (B)	-
Transmission Speed (ITU-T Image No.1)	3 seconds	Ethernet 10Base-T	6 seconds	Ethernet 10Base-T
Communication Resolution (dpi x lpi) (Conforms to ITU-T)	Tx 203 x 98 203 x 196 203 x 391 406 x 391 Rx 203 x 98 203 x 196 203 x 391 406 x 391	Tx 203 x 98 203 x 196 406 x 391 Rx 203 x 98 203 x 196 406 x 391	Tx 203 x 98 203 x 196 203 x 391 Rx 203 x 98 203 x 196	Tx 203 x 98 203 x 196 406 x 391 Rx 203 x 98 203 x 196 406 x 391
LAN Port (10Base-T Ethernet)	-	Yes	-	Yes
Scanner Mechanism				
ADF Capacity	50 Sheets		←	
Max. Document Size	11.0 x 78.7 in (280 x 2000 mm)		←	
Min. Document Size	5.83 x 5.04 in (148 x 128 mm)		←	
Effective Scanning Width	9.9 in (252 mm)		←	
Scanning Device	CCD (B4)		←	
Scanning Resolution (dpi x lpi)	203 x 98 (8 pels x 3.85 lines/mm) 203 x 196 (8 pels x 7.7 lines/mm) 203 x 391 (8 pels x 15.4 lines/mm) 406 x 391 (16 pels x 15.4 lines/mm) (Interpolated)	203 x 98 (8 pels x 3.85 lines/mm) 203 x 196 (8 pels x 7.7 lines/mm) 406 x 391 (16 pels x 15.4 lines/mm)	203 x 98 (8 pels x 3.85 lines/mm) 203 x 196 (8 pels x 7.7 lines/mm) 203 x 391 (8 pels x 15.4 lines/mm)	203 x 98 (8 pels x 3.85 lines/mm) 203 x 196 (8 pels x 7.7 lines/mm) 406 x 391 (16 pels x 15.4 lines/mm)
Scanning Speed (A4 size document, standard resolution)	Approx. 0.9 seconds		Approx. 2.8 seconds	
Reduction XMT	Yes (B4 → A4/Letter)	Fixed (B4 → A4 only)	Yes (B4 →A4/Letter)	
Collation Stack	Yes		←	
Printer Mechanism				
Recording Method	Laser Printing		←	
Recording Paper Size	A4/Letter/Legal		←	
Recording Paper Capacity	500 sheets (Cassette)		250 sheets (Cassette)	
Effective Printing Width	Ltr/Lgl : 8.19 in (208 mm) A4 : 7.95 in (202 mm)		←	
Recording Resolution	406 x 391 dpi (Fax or Copy) 600 x 600 dpi (Printer)		406 x 391 dpi	
Recording Speed	10 ppm (6 sec / page)		←	
Heater Timer (Inc. Fan Timer)	Yes		←	
Collation Stack	Yes (Memory)		←	
Cassette Size Detector	Yes		←	
Document Memory				
Document Memory Capacity (Flash Memory)	120 pages (2 MB)		350 pages (5 MB D-RAM)	
Optional Document Memory (Flash Memory)	Yes 1 MB : +80 pages 2 MB : +160 pages 4 MB : +320 pages 8 MB : +640 pages		No	
Document Memory Backup	Yes (Permanent)		Yes (1 hour)	

Items	DX-2000		DX-1000	
	PSTN	LAN	PSTN	LAN
Optional Document Memory Backup	No (Not required)		No	
Printer Page Memory				
Page Memory (D-RAM Memory)	4 MB		←	
Optional Page Memory (D-RAM Memory)	Yes 2 MB 4 MB 8 MB		No	
Copy Quality				
ABC	Yes		←	
Contrast Selection	Yes (3 levels) [New Type]		←	
Halftone (Photo)	64 levels Error Diffusion, Fast and Quality Mode		←	
400 dpi (Interpolated)	Yes		203 x 391 [TX only]	406 x 391
Smoothing	Yes (Copy and Fax) No (PC Printing)		←	
Construction				
Dimensions (W x D x H)	17.3 x 19.4 x 12.2 (440 x 492 x 310 mm)		16.9 x 16.4 x 11.0 (430 x 415 x 280 mm)	
Weight	37.4 lbs (17 kg)		33 lbs (15 kg)	
Options				
Printer Interface	Yes (GDI/PDL)		No	
Encryption Interface	No		←	
Optional Recording Paper Cassette (see Note)	Yes (250, 500 or 250 + 500 sheets)		Yes (250 sheets)	
Telephone Handset	Yes		←	

Note: Paper Cassette Configuration



A4: 210 x 297 mm
Letter: 216 x 279 mm
Legal: 216 x 356 mm

1.10. Function Table

Items	DX-2000		DX-1000	
	PSTN	LAN	PSTN	LAN
Dual Operation				
Dual Port Communication (PSTN & LAN)	Yes (Simultaneous)		No	
Direct XMT Reserve	Yes	No	Yes	No
Memory XMT Reserve	Yes		←	
Max. Number of Memory Job Files	70 Files		30 Files	
Dialing/Telephone Features				
One-Touch Keys	32		←	
One-Touch/Program Keys	8		←	
One-Touch Auto Dialers	40		←	
Abbreviated Auto Dialers	160		←	
Max. Auto Dialing Locations	200		←	
Max. Tel No. Digits/Email Characters	36	60 (characters)	36	60 (characters)
Max. Station Name Characters	15		←	
Directory Search Dialing	Yes		←	
Full Number Dialing (Buffered Dialing)	70 stations		50 stations	
Direct Dialing (Monitor Dialing) (see Note)	Yes		←	
Automatic Redialing	Yes		Yes	No
Manual Redialing	Yes		Yes	No
Chain Dialing	Yes		Yes	No
Line Monitor Speaker	Yes	No	Yes	No
Pulse/Tone Dialing	Yes	No	Yes	No
Pulse/Tone Change	Yes	No	Yes	No
Flash Key	Yes	No	Yes	No
Transmission Features				
Direct Transmission	Yes	No	Yes	No
Memory Transmission	Yes		←	
Multi-Station Transmission	Yes (270 stations)	No	Yes (250 stations)	No
Simultaneous Multi-Station XMT	No	Yes (270 stns)	No	Yes (200 stns)
Email/G3 Mixed Broadcast	Yes		No	
Deferred Transmission	No		←	
Deferred Multi-Station XMT	No		←	
Priority Direct Transmission	Yes (ADF TX Reserve)	No	Yes (ADF TX Reserve)	No
Batch Transmission	No		←	
Cover Sheet	No		←	
File Transmission	No		←	
Edit File Mode	Yes		No	
Reception Features				
Substitute Reception	Yes		←	
Fixed Reduction	Yes		←	
Auto Reduction	Yes		←	
Overlap Printing	Yes		←	
Receive to Memory	No		←	
Remote Reception	No		←	
Distinctive Ring Detector	Yes (Specific Countries only)	No	Yes	No
LAN Communication Features				
Internet FAX Communication	-	Yes	-	Yes
Internet email Reception	-	Yes	-	Yes
Internet Fax Server Functions				
(1) Internet Fax Relay XMT	No	Yes (70 stns)	No	Yes (50 stns)
(2) Email Relay XMT	No	Yes (70 stns)	No	Yes (50 stns)
(3) Fax Forwarding	Yes		←	
(4) PC-FAX Communication	No		←	
(5) Auto Routing (SUB/TSI)	Yes		←	
Network Scanner	No	Yes (400 dpi)	No	Yes (400 dpi)
Network Printer	No	Yes (300/600 dpi)	No	Yes (200/400 dpi)
"Subject" Line	No	Programmable	No	Programmable
Sender Selection (Email)	Selectable (25)		←	
Remote Autodialer Programming	No	Yes	No	Yes
Remote Internet Parameter Programming	No	Yes	No	
Internet Fax Return Receipt	No	Yes	No	Yes

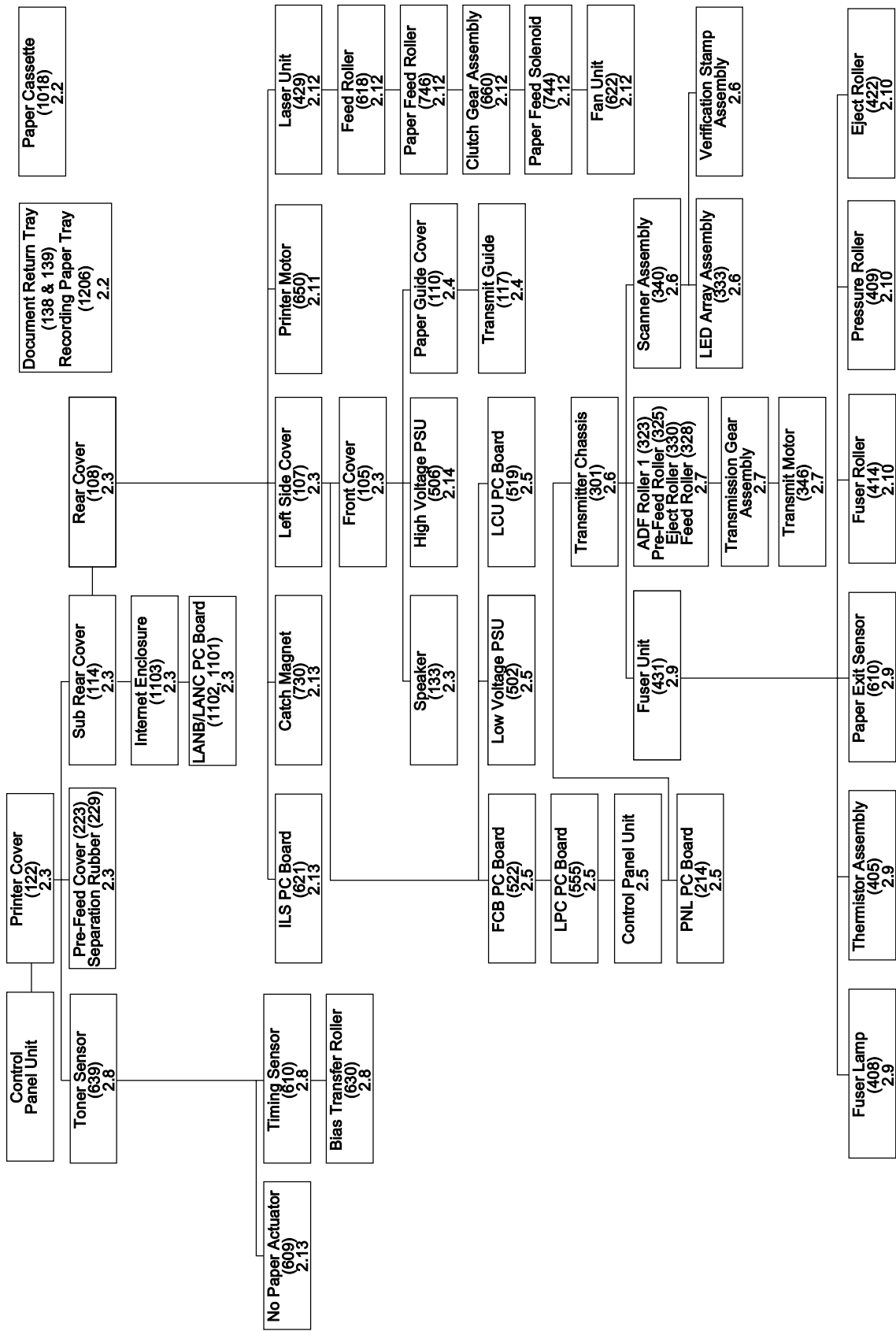
Items	DX-2000		DX-1000	
	PSTN	LAN	PSTN	LAN
DNS client	No	Yes	No	Yes
Polling Features				
Polling	Yes	No	Yes	No
Turnaround Polling	No		←	
Multi-Station Polling	Yes (270 stations)	No	Yes (250 stations)	No
Continuous Polling XMT	No		←	
Continuous Polling RCV	No		←	
Deferred Polling	No		←	
Deferred Multi-Station Polling	No		←	
Direct Polling XMT	No		←	
Memory Polling XMT	No		←	
Temporary Polling Password	Yes	No	Yes	No
Preset Polling Password	Yes	No	Yes	No
Copy Features				
Single Copy	Yes		←	
Multiple Copy	Yes (99 copies)		←	
Copy Enlargement	No		←	
Copy Reduction	Yes		←	
Copy Resolution	406 x 391 lpi		←	
Certainty				
Verification Stamp	Yes		←	
Header / Total Page Print	Yes		←	
Comm. Journal	Yes (w / Page Image)		←	
Transaction Journal	Yes (100)		←	
Last Individual XMT Journal	No		←	
View Mode	Yes		←	
List Printouts				
One-Touch List	Yes		←	
Abbr. No. List	Yes		←	
Program List	Yes		←	
Directory Search List	Yes		←	
Fax Parameter List	Yes		←	
Internet Parameter List	Yes		←	
File List	Yes		←	
Character Code List	No		←	
Directory Sheet	Yes		←	
Callback Message	No		←	
Identification				
Logo/TTI	25 characters		←	
Multiple Logo	No		←	
Character ID	16 characters	No	16 characters	No
Numeric ID (TSI / CSI / CIG)	20 digits	No	20 digits	No
Special Communication				
Password XMT/RCV	No		←	
Selective Reception (TSI check)	No		←	
Relay XMT Request	No		←	
Relay XMT Center	No		←	
Confidential XMT/Polling	No		←	
Confidential Center	No		←	
Mailbox XMT/Polling	No		←	
Mailbox Center	No		←	
OMR-XMT	No		←	
Sub-Address XMT	Yes (Routing)		←	
Sub-Address RCV	Yes (Routing)		←	
Check & Call Function	Yes		←	
Others				
Access Code	Yes		No	
PIN Code Access (PBX Access Code)	Yes		←	
Department Code	No		←	
Energy Saver Mode (Energy Star Compliant)	Yes		←	
Day Light Time Saver	Yes		←	
Panel Display	20 x 2 Line Alphanumeric LCD		←	
Logo Input Method	Character Keys		←	
Remote Diagnostic Function	Yes	No	Yes	No
Self Diagnostic Function	Yes	No	Yes	No

Items	DX-2000		DX-1000	
	PSTN	LAN	PSTN	LAN
Internal Demo	No		←	
2-W Leased Line	No		←	
AI (Intelligent) Redial	Yes (Up to 4 files)		Yes (Up to 2 files)	
Auto Multi-copy	No		←	
Auto Forwarding	Yes		←	
Check & Call Function	Yes		←	

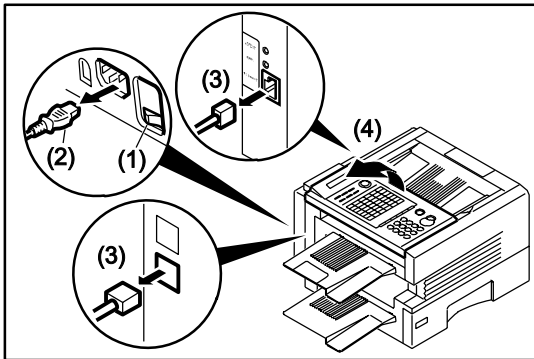
Note: During Dialing Mode, the START button must be pressed to initiate fax communication. During this mode automatic Redialing is not available.

2 Disassembly Instructions

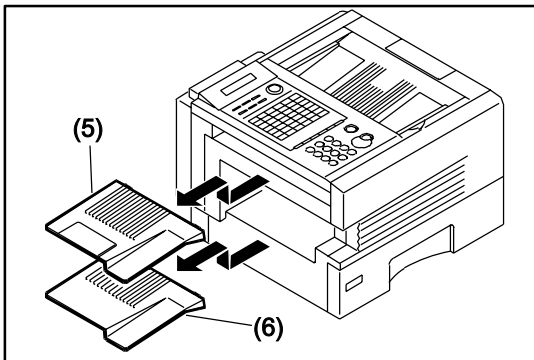
2.1. General Disassembly Flowchart



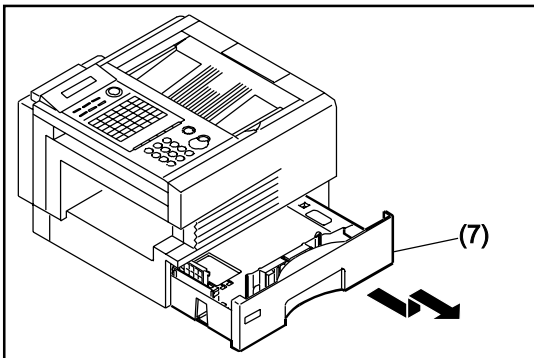
2.2. Power Cord (1208), Telephone Line Cable (1207), Document Return Tray (138 and 139), Recording Paper Tray (1206), Paper Cassette (1018)



- (1) Turn the **Power Switch** to the OFF (O) position.
- (2) Disconnect the **Power Cord** (1208).
- (3) Disconnect the **Telephone Line Cable** (1207) and **LAN Cable**.
- (4) Open the **Control Panel Unit**.

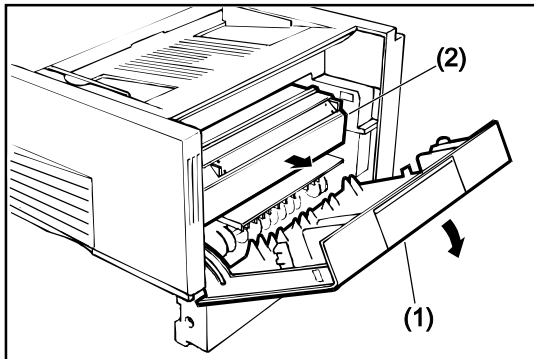


- (5) Remove the **Document Return Tray** (138 and 139).
- (6) Remove the **Recording Paper Tray** (1206).

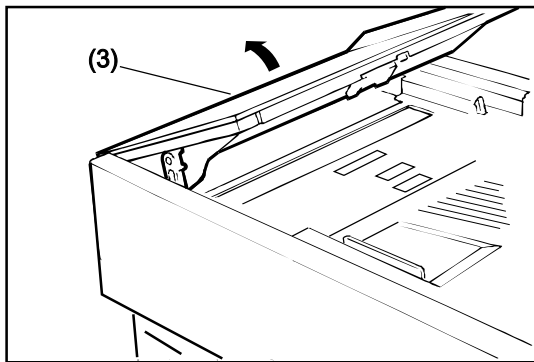


- (7) Remove the **Paper Cassette** (1018).

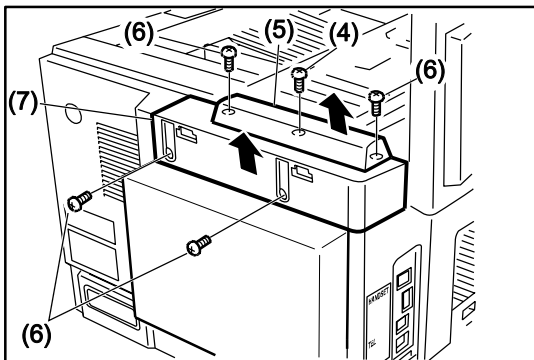
2.3. Sub Rear Cover (114), Internet Enclosure (1103), LANB PC Board (1102), LANC PC Board (1101), FRM PC Board (1104), Rear Cover (108), Left Side Cover (107), Front Cover (105), Speaker (133)



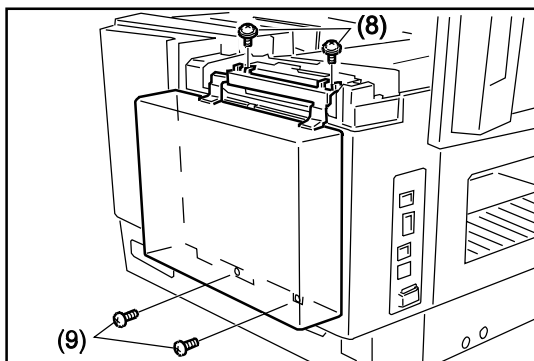
- (1) Open the **Printer Cover** (122).
- (2) Remove the **Toner Cartridge**.



- (3) Open the **Control Panel Unit**.



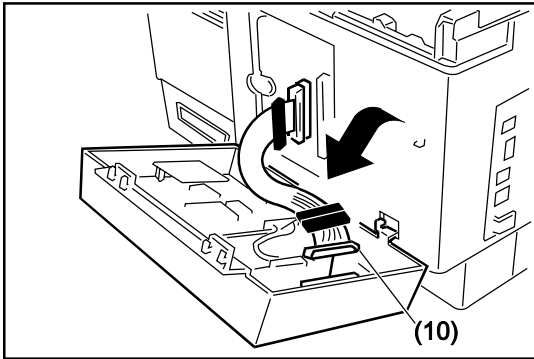
- (4) Remove 1 **Screw** (B1).
- (5) Remove the **Memory Card Cover** (115).
- (6) Remove 4 **Screws** (B1).
- (7) Remove the **Sub Rear Cover** (114).



- (8) Remove 2 **Screws** (23).

Caution:

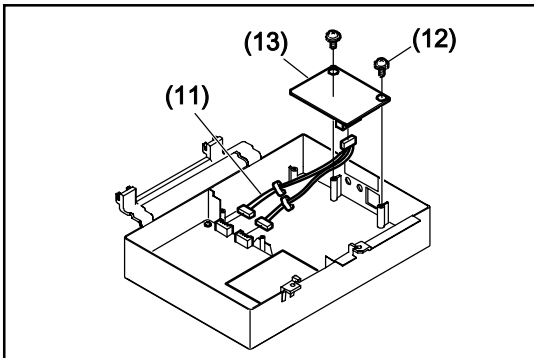
- When re-installing these machine screws (screws with washers), ensure they are placed on the top of the enclosure.
- (9) Remove 2 **Screws** (B1).



(10) Disconnect the **Ribbon Cable Connector (CN7)** on the LANB PC Board.

Caution:

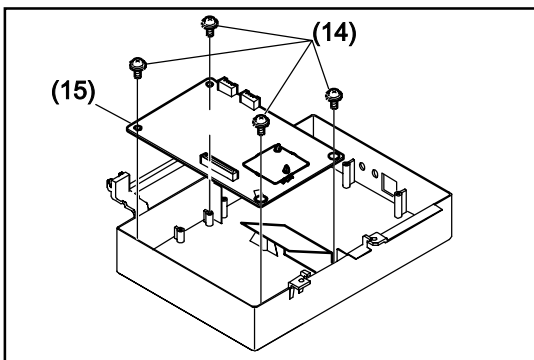
When re-installing the Ribbon Cable, ensure that the connector with the larger Ferite Core is inserted into the LANB PC Board (CN7).



(11) Disconnect **Connector CN1** and **CN2** on the LANB PC Board.

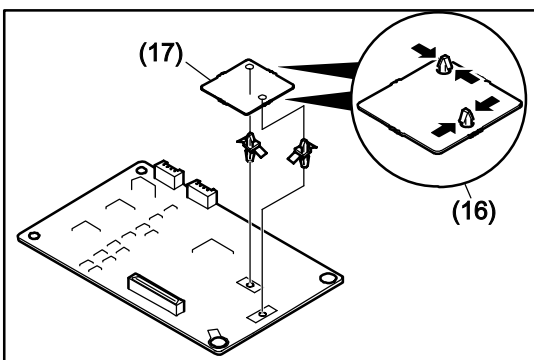
(12) Remove 2 **Screws (23)**.

(13) Remove the **LANC PC Board (1101)** and disconnect **Connector CN200** on the LANC PC Board.



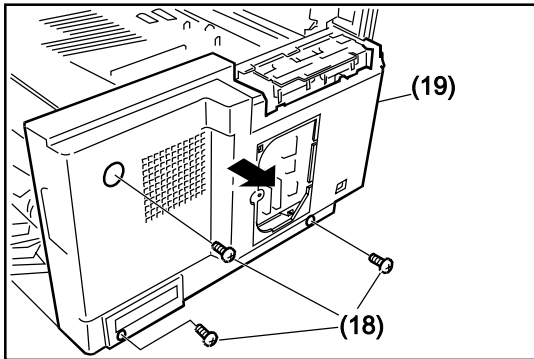
(14) Remove 4 **Screw (23)**.

(15) Remove the **LANB PC Board (1102)**.

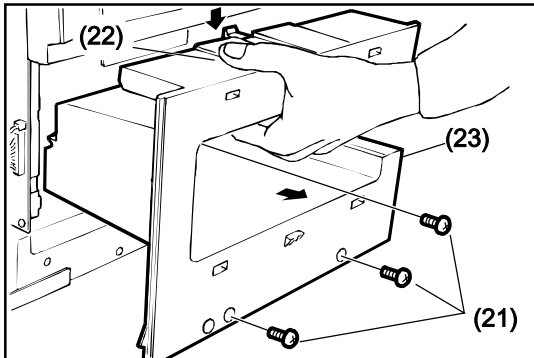


(16) Release the two **PCB Spacers (146)**.

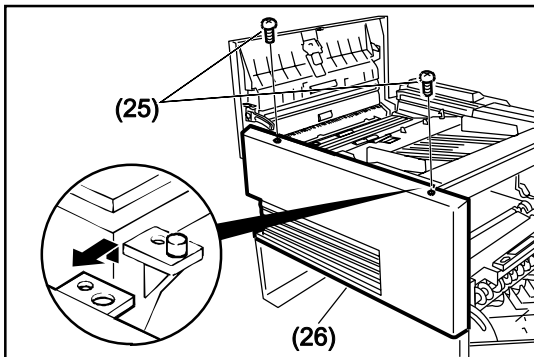
(17) Remove the **FRM PC Board (1104)**.



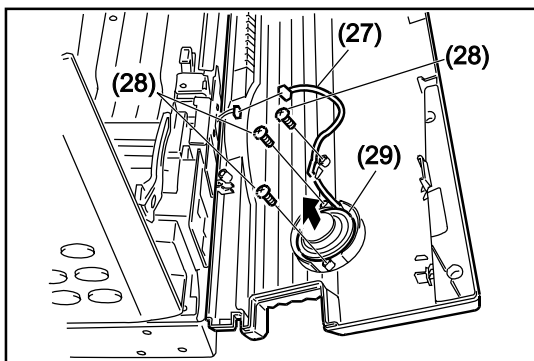
- (18) Remove 3 **Screw (B1)**.
 (19) Remove the **Rear Cover (108)**.



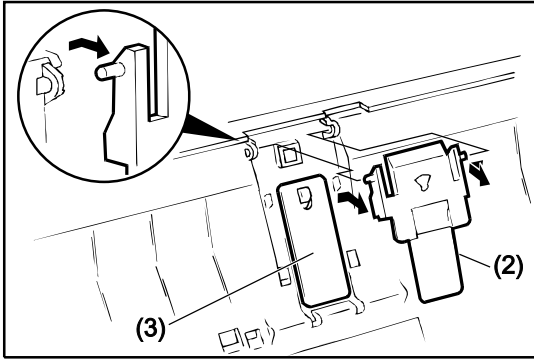
- (20) Close the **Control Panel Unit**.
 (21) 3 **Screws (B1)**.
 (22) Hold in the center and release the **Latch Hook**.
 (23) Remove the **Left Side Cover (107)**.



- (24) Open the **Control Panel Unit**.
 (25) 2 **Screws (B1)**.
 (26) Release the hook and remove the **Front Cover (105)**.



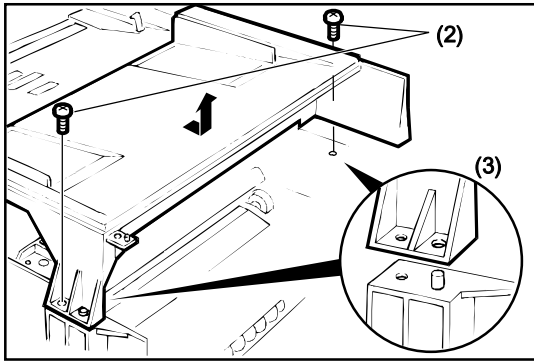
- (27) Disconnect **Connector** on the **Speaker Harness**.
 (28) 2 **Screws (B1)**, 1 **Screw (1Y)**.
 (29) Remove the **Speaker Assembly (133)**.



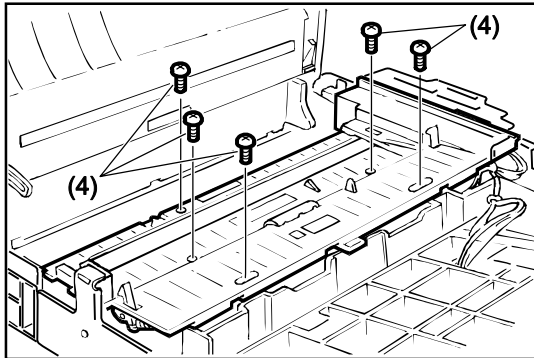
Cleaning Separation Rubber (229)

- (1) Open the **Control Panel Unit**.
- (2) Remove the **Pre-Feed Cover (223)**.
- (3) Clean the **Separation Rubber (229)** with a soft cloth, soaked with isopropyl alcohol.

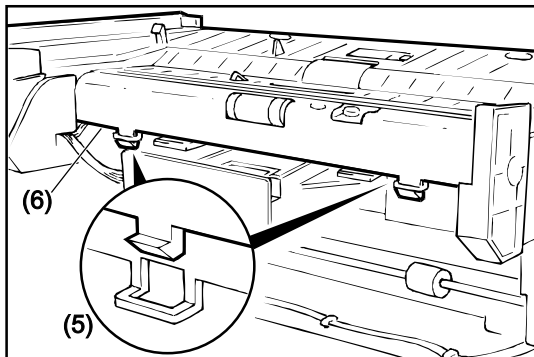
2.4. Paper Guide Cover (110), Transmit Guide (117), SNS Assembly (121)



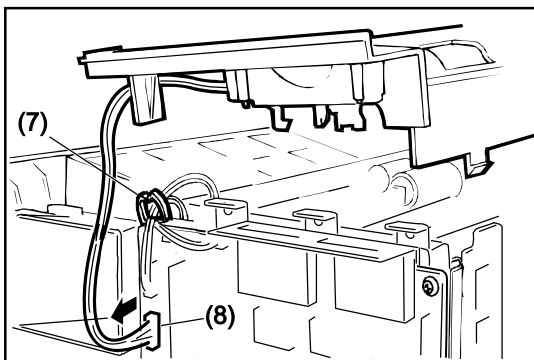
- (1) Remove the **Front Cover (105)** and the **Rear Cover (108)** (Refer to 2.3.).
- (2) **2 Screws (19)**.
- (3) Remove the **Paper Guide Cover (110)**.



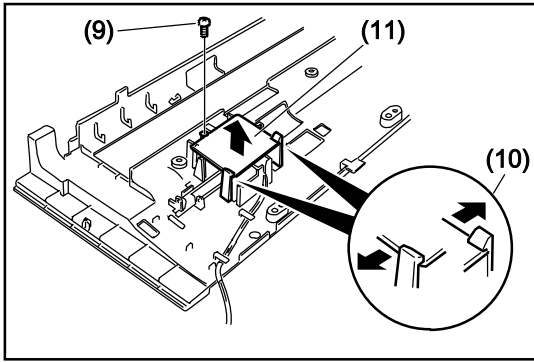
- (4) **5 Screws (19)**.



- (5) Release two **Latch Hooks**.
- (6) Remove the **Transmit Guide (117)**.

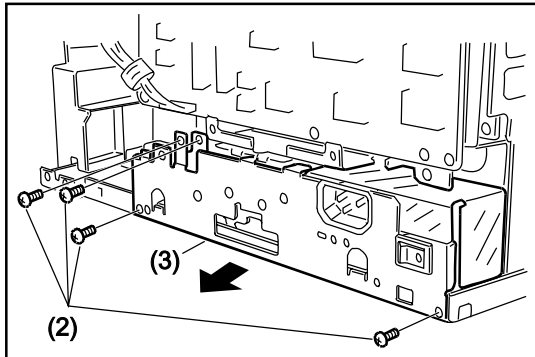


- (7) Remove the **SNS Assembly Harness** from the clamp.
- (8) Disconnect **Connector CN7** on the **FCB PC Board**.

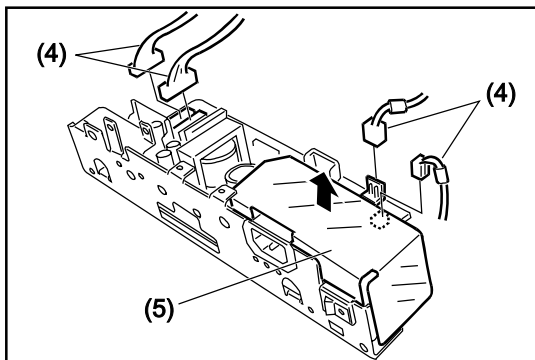


- (9) 1 **Screw** (19).
- (10) Release two Latch Hooks.
- (11) Remove the **SNS Assembly** (121).

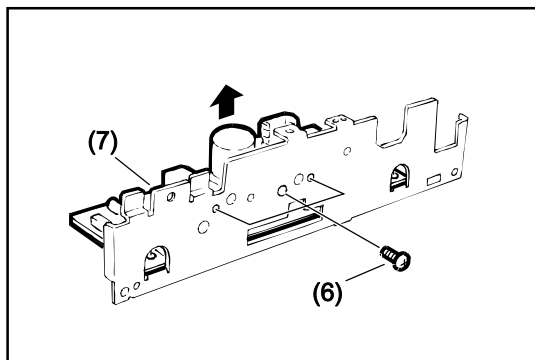
2.5. Low Voltage Power Supply Unit (502), FCB PC Board (522), LCU PC Board (519), LPC PC Board (555), Control Panel Unit, PNL PC Board (214)



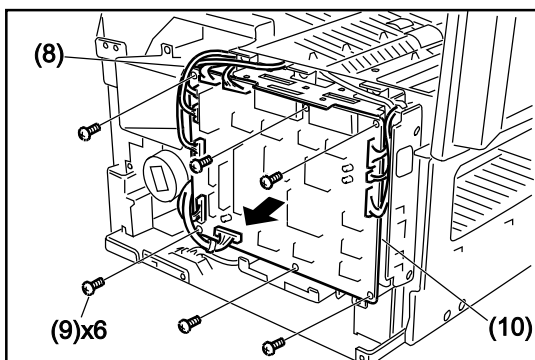
- (1) Remove the **Left Side Cover** (107) and the **Rear Cover** (108) (Refer to 2.3.).
- (2) **4 Screws** (19).
- (3) Pull out the **Low Voltage Power Supply Assembly**.



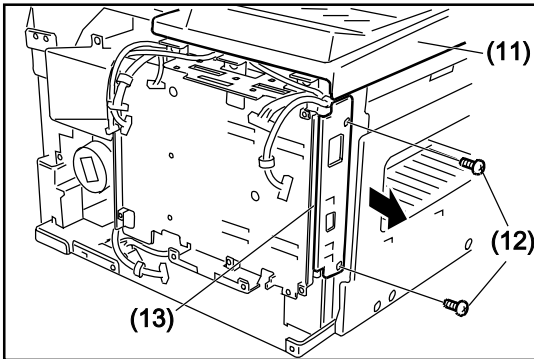
- (4) Disconnect **4 Connectors** on the Low Voltage Power Supply Assembly.
- (5) Remove the **Mylar Shield** (508).



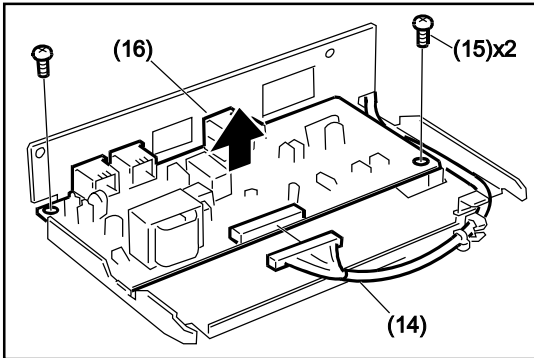
- (6) **3 Screws** (19).
- (7) Remove the **Low Voltage Power Supply Unit** (502).



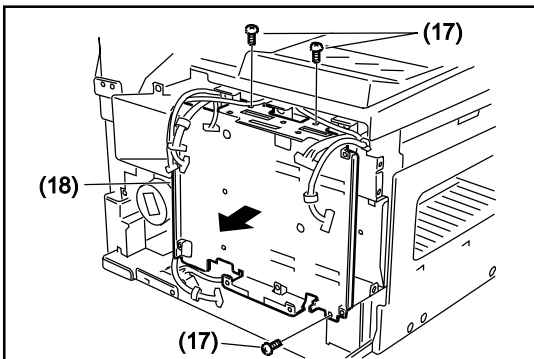
- (8) Disconnect all **Connectors** on the FCB PC Board.
- (9) **6 Screws** (C8).
- (10) Remove the **FCB PC Board** (522).



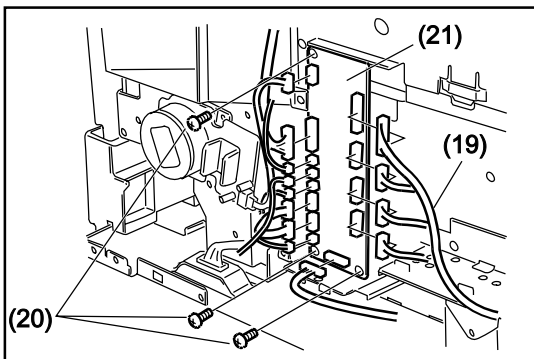
- (11) Close the **Control Panel Unit**.
- (12) 2 **Screws** (19).
- (13) Remove the **LCU Bracket** (512).



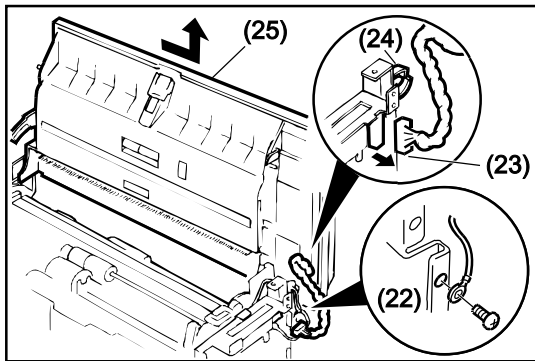
- (14) Disconnect **Connector CN25** on the LCU PC Board.
- (15) 2 **Screws** (C8).
- (16) Remove the **LCU PC Board** (519).



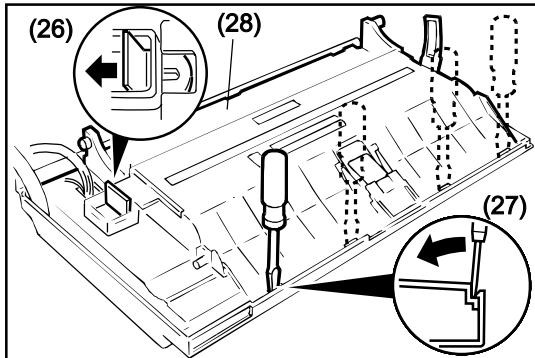
- (17) 3 **Screws** (19).
- (18) Remove the **FCB Bracket** (523).



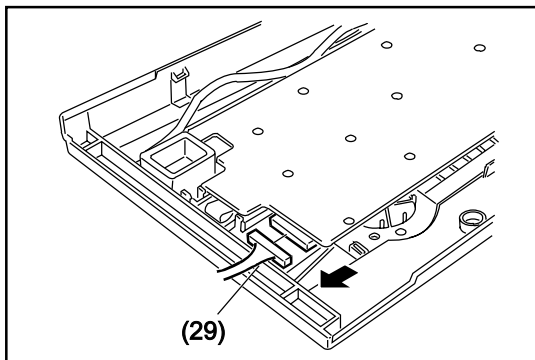
- (19) Disconnect all **Connectors** on the LPC PC Board.
- (20) 3 **Screws** (C8).
- (21) Remove the **LPC PC Board** (555).



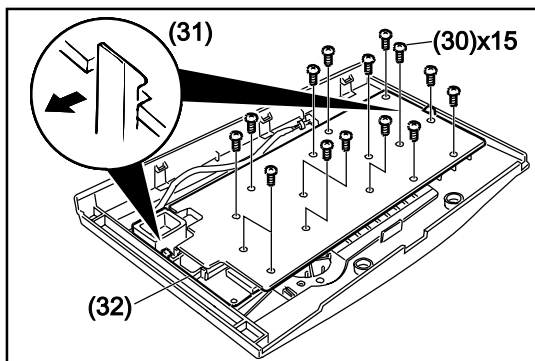
- (22) 1 Screw (19) and remove the **Ground Strap** (540).
- (23) Disconnect **Connector CN11** on the FCB PC Board.
- (24) Remove the Harness from the clamp.
- (25) Remove the **Control Panel Unit**.



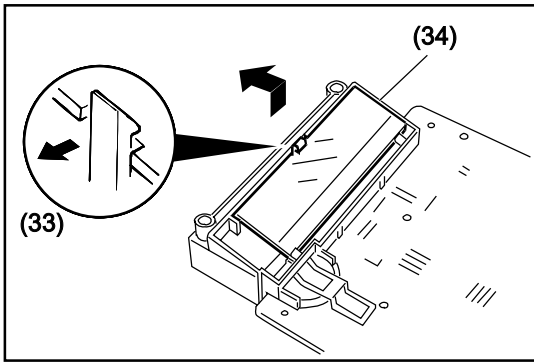
- (26) Remove the **Battery Holder** (1114) Assembly.
- (27) Release 4 Latch Hooks.
- (28) Remove the **Control Panel Chassis** (216).



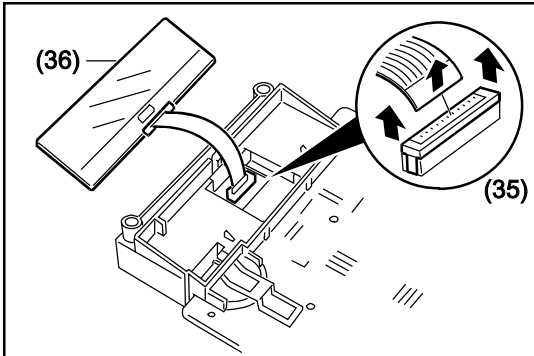
- (29) Disconnect **Connector CN41** on the PNL PC Board.



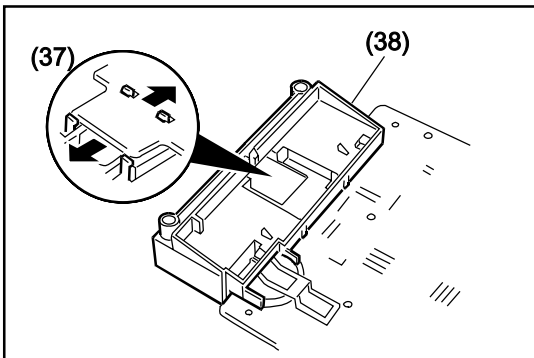
- (30) 15 **Screws** (7B).
- (31) Release two Latch Hooks.
- (32) Remove the **PNL PC Board** (214).



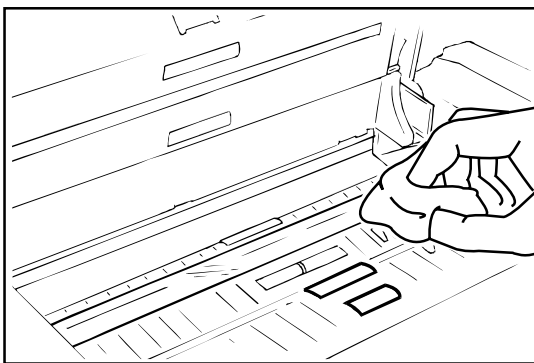
- (33) Release Latch Hook.
 (34) Carefully lift the **LCD Unit (215)**.



- (35) Disconnect **Connector CN42** on the PNL PC Board.
 (36) Remove the **LCD Unit (215)**.



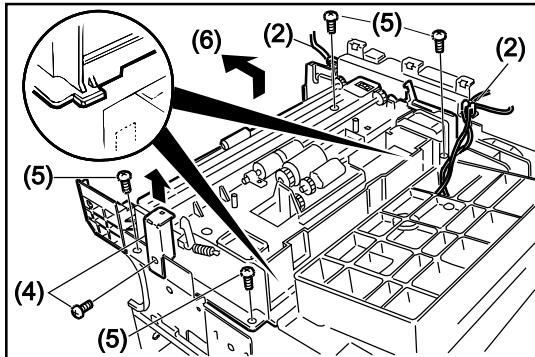
- (37) Release 4 Latch Hooks on the back of the LCD Holder.
 (38) Remove the **LCD Holder (232)**.



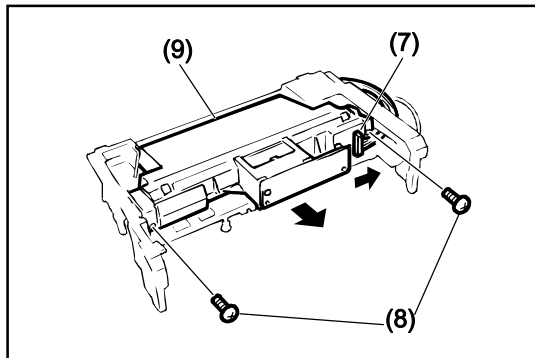
Cleaning ADF Roller (323), Pre-Feed Roller (325), Feed Roller (328), Eject Roller (330) and the Scanner Glass (341)

- (1) Open the **Control Panel Unit**.
- (2) Clean the **ADF Roller (323)**, **Pre-Feed Roller (325)**, **Feed Roller (328)**, **Eject Roller (330)** and the **Scanner Glass (341)** with a soft cloth, soaked with isopropyl alcohol.

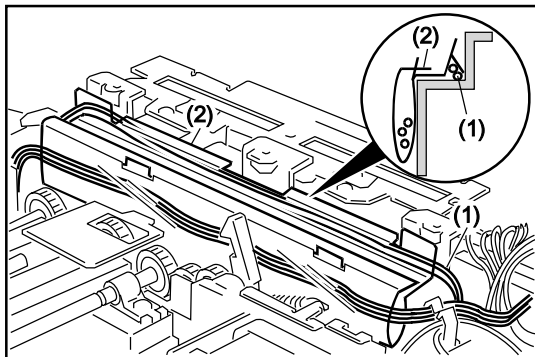
2.6. Transmitter Chassis (301), Scanner Assembly (340), LED Array Assembly (333), Verification Stamp Assembly



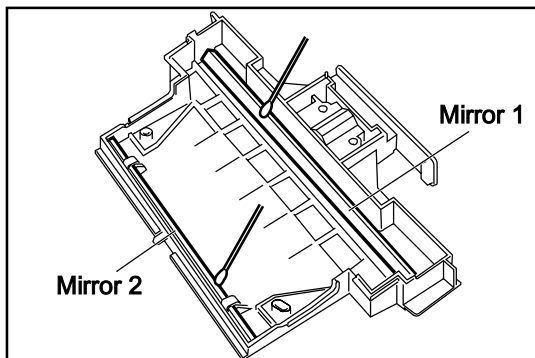
- (1) Remove the **Front Cover** (105), **Rear Cover** (108) (Refer to 2.3.) and the **Control Panel Unit** (Refer to 2.5.).
- (2) Remove all the harnesses from the clamps.
- (3) Disconnect **Connector CN8** on the FCB PC Board.
- (4) 1 **Screw** and remove the **Front Bracket 2** (136).
- (5) 4 **Screws** (19).
- (6) Remove the **Transmitter Chassis** (301) Assembly.



- (7) Disconnect **Connector CN30** on the CCD PC Board.
- (8) 2 **Screws** (19).
- (9) Remove the **Scanner Assembly** (340).

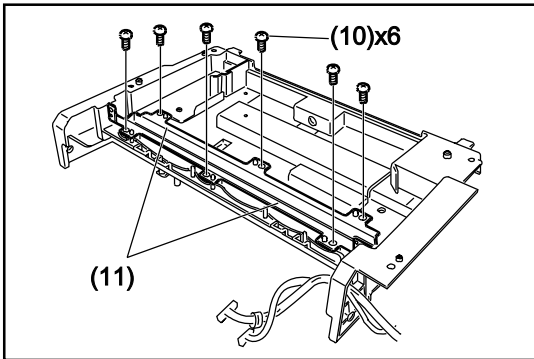


- Note:** When reinstalling the CCD Harness,
1. Separate the **CCD Harness** (545) from the other harnesses.
 2. Place the other harnesses into the **Harness Protector Film** (556).



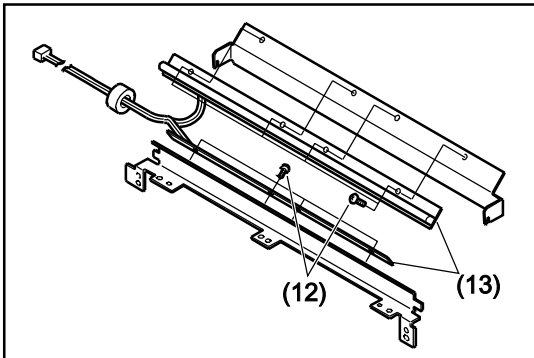
Cleaning Mirror 1 (337), Mirror 2 (338)

Clean the **Mirror 1** (337) and **Mirror 2** (338) with a soft cloth, soaked with isopropyl alcohol.



(10) 6 **Screws** (19).

(11) Remove the **LED Array Bracket 1** (332) and **LED Array Bracket 2** (351).

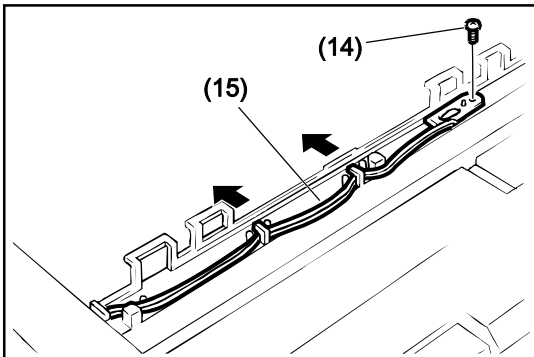


(12) 8 **Screws** (9H).

(13) Remove two **LED Array Assemblies** (333).

Note:

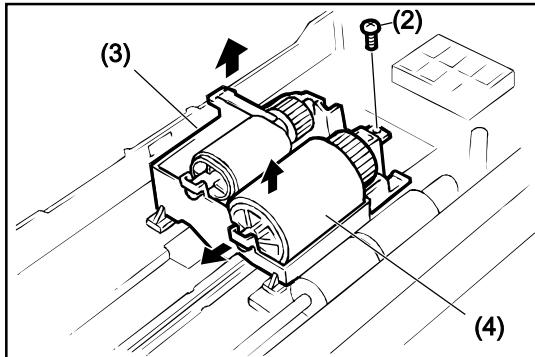
UF-885 has only one LED Array Assembly.



(14) 1 **Screw** (19).

(15) Remove the **Stamp Holder** (334) and **Stamp Solenoid** (335).

2.7. ADF Roller (323), Pre-Feed Roller (325), Eject Roller (330), Feed Roller (328), Transmission Gear Assembly, Transmit Motor (346)

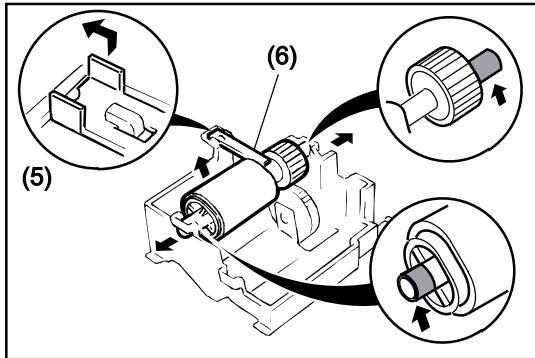


(1) Remove the **Front Cover (105)**, **Rear Cover (108)** (Refer to 2.3.), **Control Panel Unit** (Refer to 2.5.) and the **Transmitter Chassis (301)** Assembly (Refer to 2.6.).

(2) 1 **Screw (19)**.

(3) Remove the **ADF Bracket (317)** Assembly.

(4) Remove the **ADF Roller (323)**.

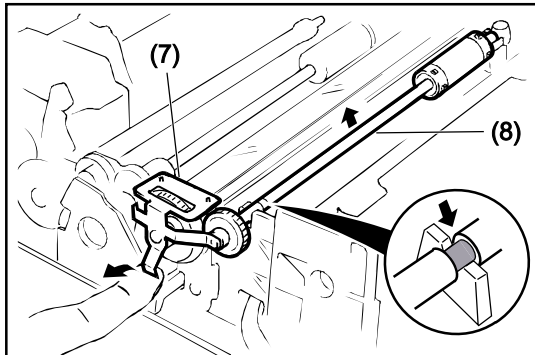


(5) Remove the **Pressure Spring Plate (324)**.

(6) Remove the **Pre-Feed Roller (325)**.

Note:

Apply Molykote EM-502L Grease to the Pre-Feed Roller (325).

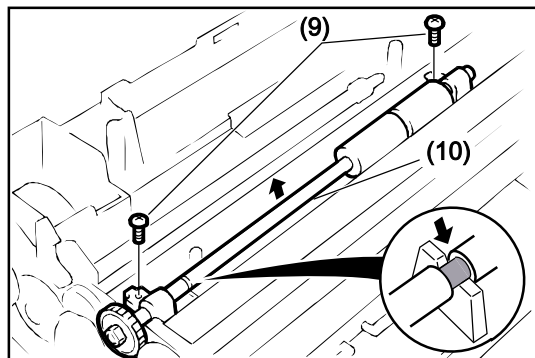


(7) Remove the **Ground Spring Plate A (316)**.

(8) Remove the document **Eject Roller (330)**.

Note:

Apply Molykote EM-502L Grease to the Eject Roller (330).

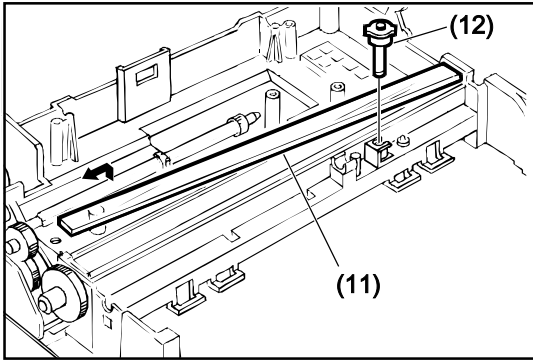


(9) 2 **Screws (19)**.

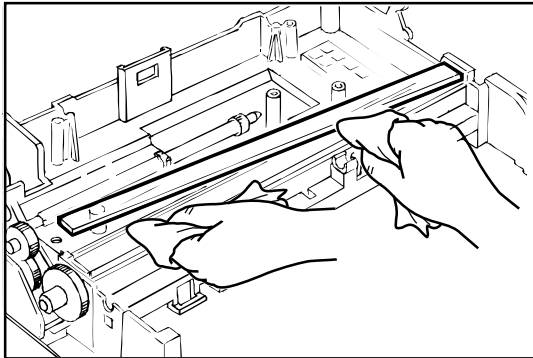
(10) Remove the **Feed Roller (328)**.

Note:

Apply Molykote EM-502L Grease to the Feed Roller (328).

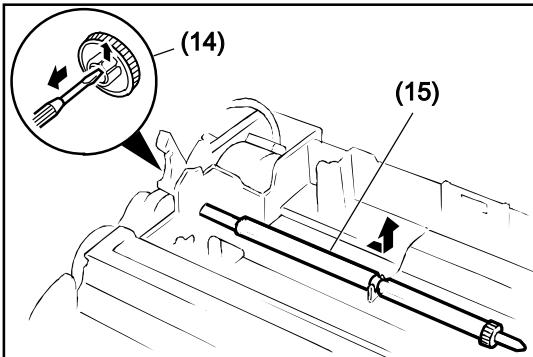


- (11) Remove the **Scanner Glass (341)**.
- (12) Remove the **Stamp Head Assembly**.



Note:

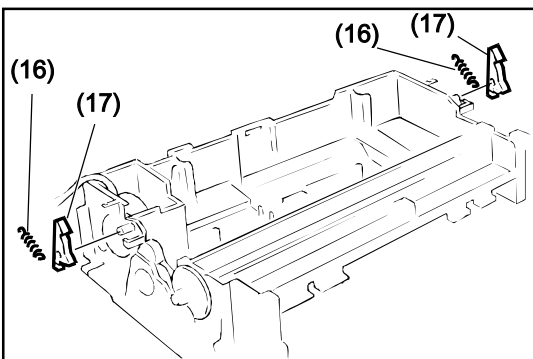
Before reassembling, clean both sides of the Scanner Glass (341) with a soft cloth, soaked with isopropyl alcohol.



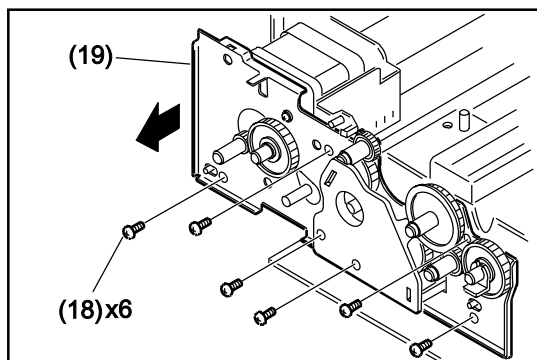
- (13) Release the hook on the drive gear.
- (14) Remove the **B31B61 Drive Gear (314)**.
- (15) Remove the **Idle Shaft (331)** and the **B18 Drive Gear (348)**.

Note:

Apply Molykote EM-502L Grease to the Idle Shaft (331).

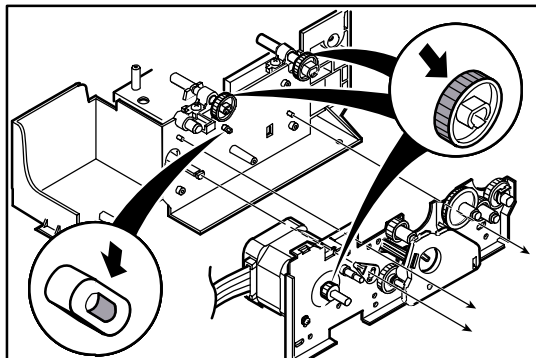


- (16) Remove 2 **Latch Coil Springs (303)**.
- (17) Remove 2 **Latches (302)**.



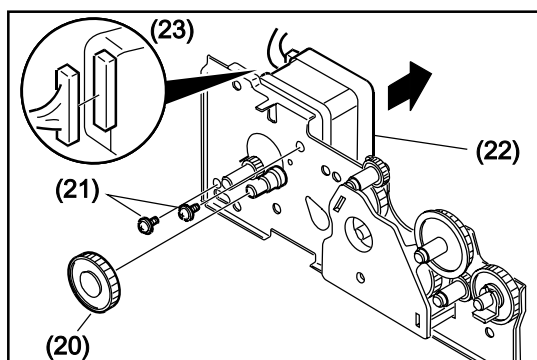
(18) 6 Screws (19).

(19) Remove the **Motor Bracket A** (304) with the Transmission Gear Assembly.



Note:

Apply Molykote EM-502L Grease to the Transmit Motor (346) Gear, B35 Drive Gear (Feed Roller) (326) and B35 Drive Gear (Eject Roller) (326).



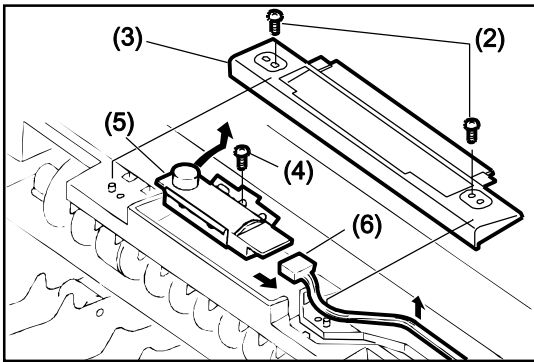
(20) Remove the **B30 Gear** (307).

(21) 2 **Screws** (36).

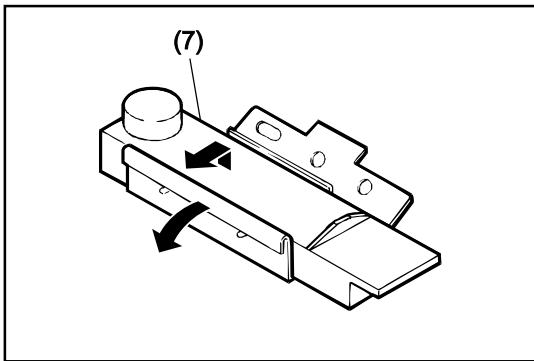
(22) Remove the **Transmit Motor** (346).

(23) Remove the **TMOT Harness** (347).

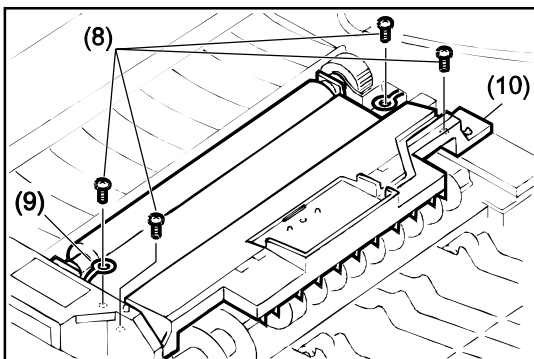
2.8. Toner Sensor (639), Timing Sensor (610), Bias Transfer Roller (630)



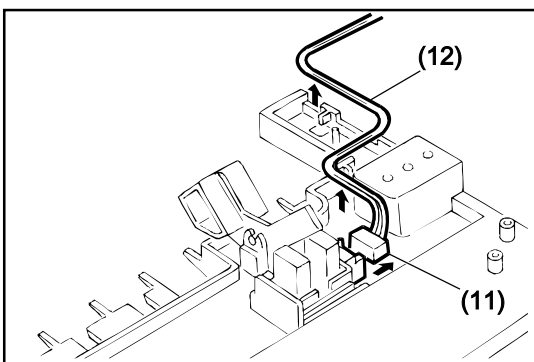
- (1) Open the **Printer Cover** (122) (Refer to 2.3.).
- (2) 2 **Screws** (19).
- (3) Remove the **Toner Sensor Cover** (640).
- (4) 1 **Screw** (19).
- (5) Remove the **Toner Sensor Assembly**.
- (6) Disconnect **Connector** and remove the **Harness** from the Upper Transport Guide.



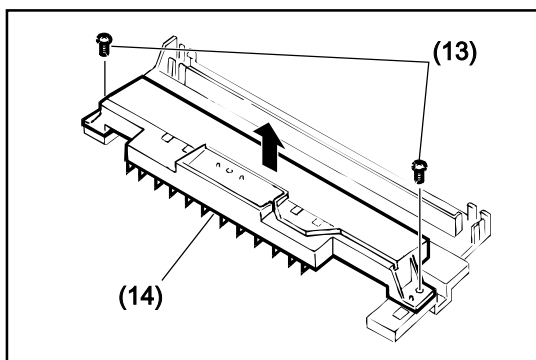
- (7) Remove the **Toner Sensor** (639).



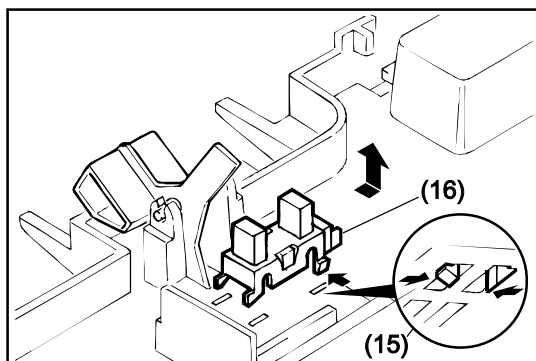
- (8) 4 **Screws** (19). (Remove the resistor screw first)
- (9) Remove the **Ground Strap** (653).
- (10) Remove the **Transport Unit**.



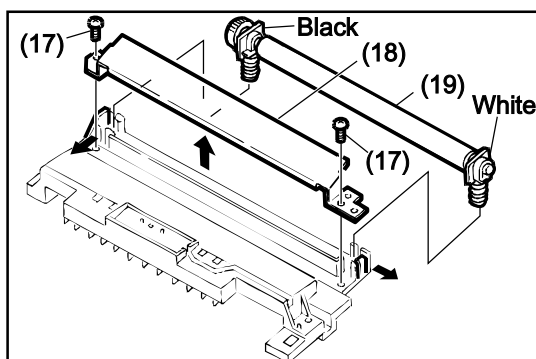
- (11) Disconnect **Connector** from the Timing Sensor.
- (12) Remove the **Harness** from the Transport Unit.



- (13) 2 Screws (19).
 (14) Remove the **Upper Transfer Guide** (635).

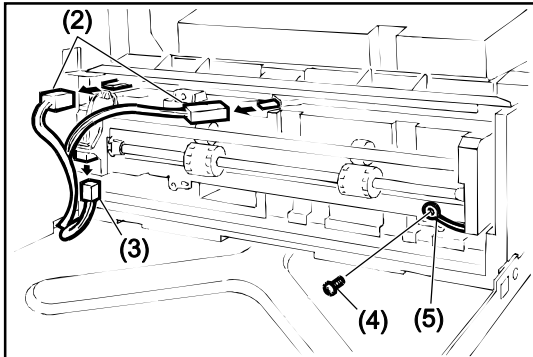


- (15) Release 2 Latch Hooks.
 (16) Remove the **Timing Sensor** (610).

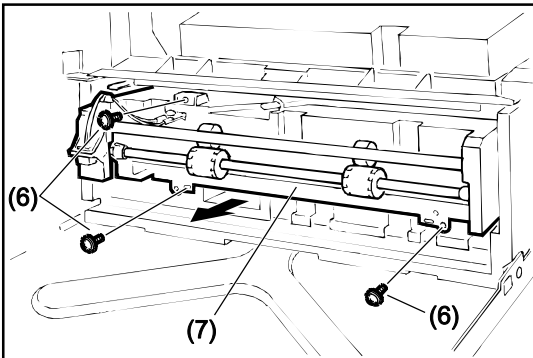


- (17) 2 Screws (19).
 (18) Remove the **BTR Guide** (629).
 (19) Remove the **Bias Transfer Roller** (630).

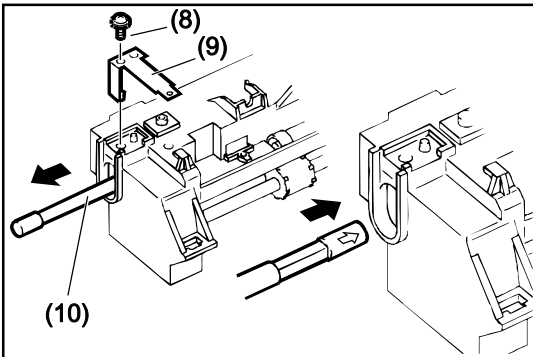
2.9. Fuser Unit (431), Fuser Lamp (408), Thermistor Assembly (405), Paper Exit Sensor (610)



- (1) Remove the **Left Side Cover (107)** (Refer to 2.3.).
- (2) Disconnect 2 **Connectors**.
- (3) Disconnect the **Relay Connector**.
- (4) 1 **Screw (19)**.
- (5) Remove the **Ground Strap (653)**.



- (6) 3 **Screws (4N)**.
- (7) Remove the **Fuser Unit (431)**.

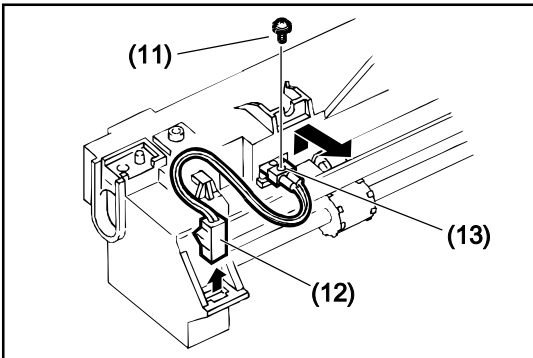


- (8) 1 **Screw (23)**.
- (9) Remove the **Fuser Lamp Terminal C (404)**.
- (10) Remove the **Fuser Lamp (408)**.

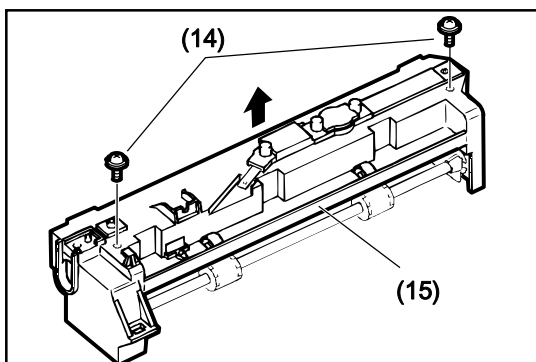
Caution:

When re-installing the Fuser Lamp, make sure that the Fuser Lamp is inserted into the Fuser Unit as illustrated on the left.

Do not touch the glass portion of the Fuser Lamp with bare hands. Grease from the fingerprints will shorten its life cycle, use isopropyl alcohol to clean fingerprints.

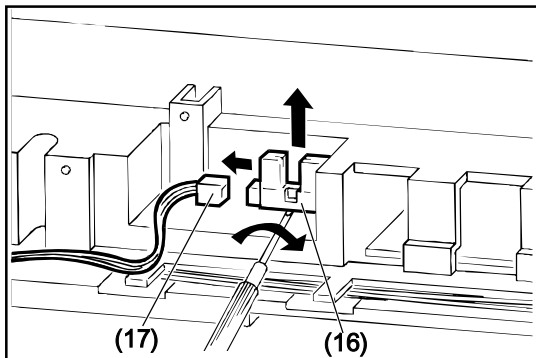


- (11) 1 **Screw (1Q)**.
- (12) Disconnect **Connector**.
- (13) Remove the **Thermistor Assembly (405)**.



(14) 2 **Screws** (23).

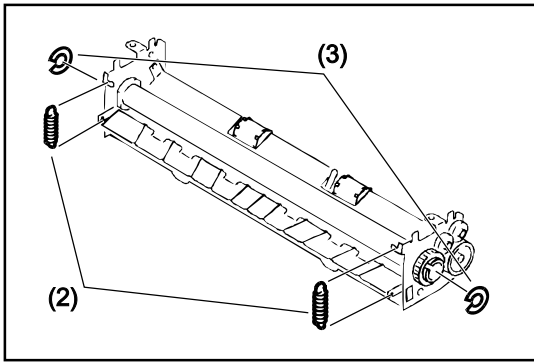
(15) Remove the **Fuser Cover** (401).



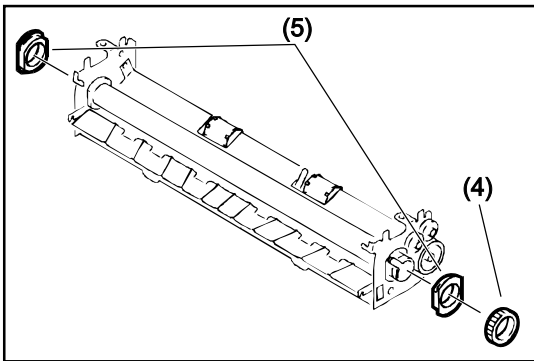
(16) Remove the **Paper Exit Sensor** (610).

(17) Disconnect **Connector**.

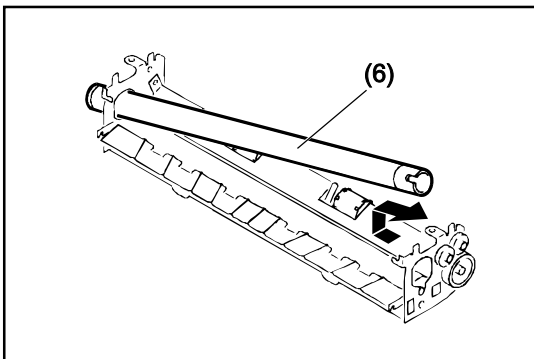
2.10. Fuser Roller (414), Pressure Roller (409), Eject Roller (422)



- (1) Remove the **Fuser Unit (431)** (Refer to 2.9.).
- (2) **2 Pressure Springs (412)**.
- (3) **2 C-Rings (418)**.



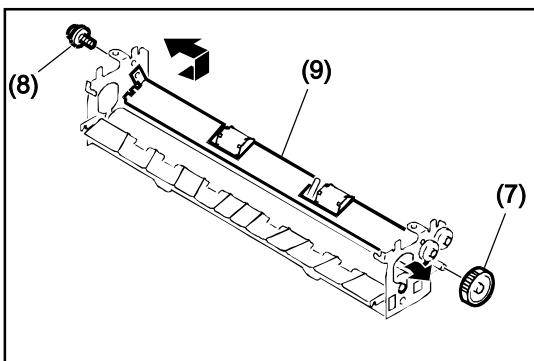
- (4) Remove the **E24 Drive Gear (417)**.
- (5) Remove **2 P17L6.8 Bushings (416)**.



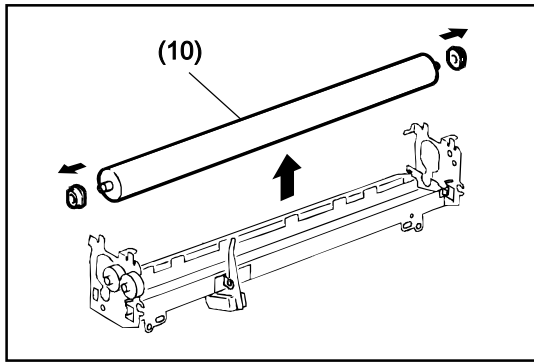
- (6) Remove the **Fuser Roller (414)**.

Caution:

Do not scratch the surface of the Fuser Roller when removing or re-installing it.



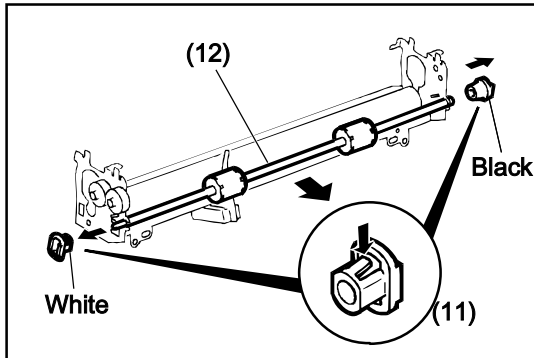
- (7) Remove the **E22 Gear (425)**.
- (8) **1 Screw (4N)**.
- (9) Remove the **Lower Paper Guide (426)**.



(10) Remove the **Pressure Roller** (409).

Caution:

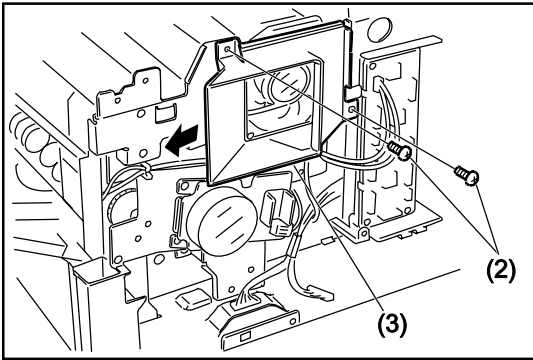
Do not scratch the surface of the Pressure Roller when removing or re-installing it.



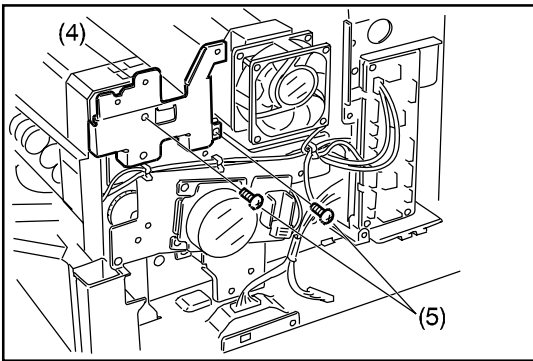
(11) Remove the **Black** and the **White Bushings** (423) (424).

(12) Remove the **Eject Roller** (422).

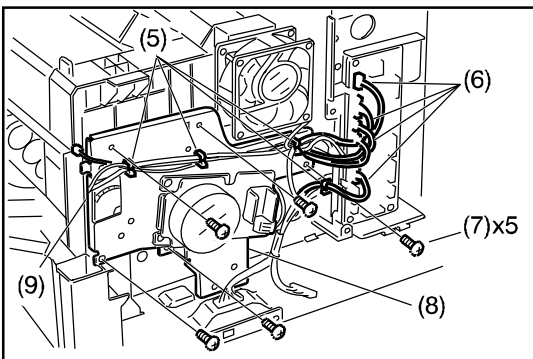
2.11. Fan Duct (520), Printer Motor (650), Motor Bracket (641)



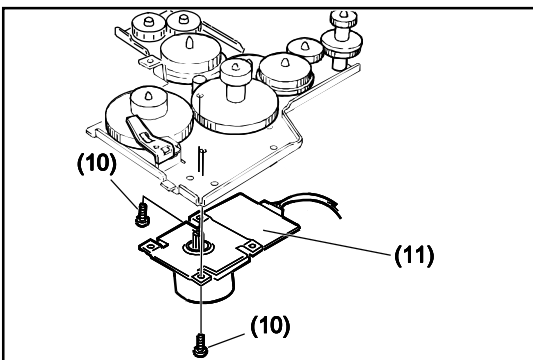
- (1) Remove the the Front Cover (105), Rear Cover (108) (Refer to 2.3.), Control Panel Unit and FCB Bracket (523) (Refer to 2.5.).
- (2) 2 **Screws** (19).
- (3) Remove the Fan Duct (520).



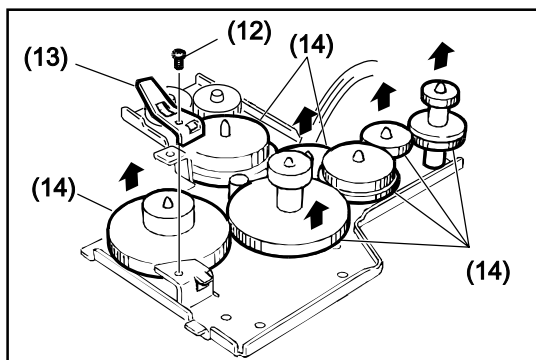
- (4) 2 **Screws** (19).
- (5) Remove the Fan Duct Bracket (526).



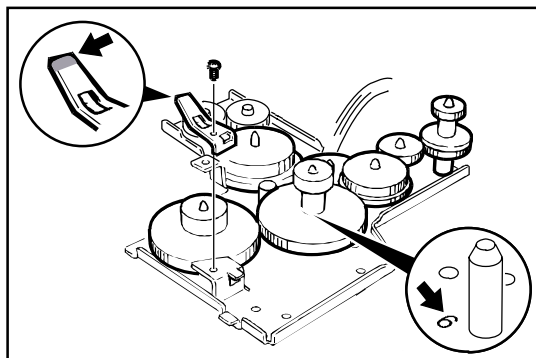
- (6) Remove the **Harnesses** from the 4 clamps.
- (7) Disconnect **Connectors CN54, 55, 59, 61, 62 and 63** on the LPC PC Board.
- (8) 5 **Screws** (19).
- (9) Remove the **Motor Bracket** (641).



- (10) 2 **Screws** (19).
- (11) Remove the **Printer Motor** (650).



- (12) 1 Screw (19).
- (13) Remove the Transfer Ground Spring (649).
- (14) 7 Gears.



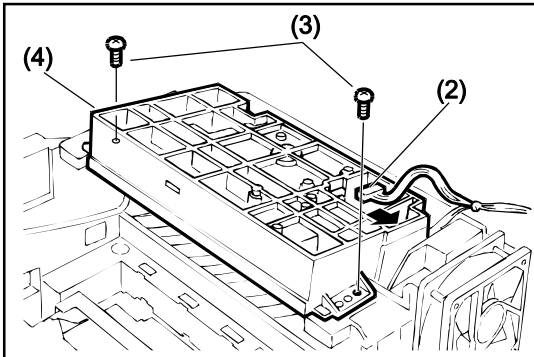
Caution:

When re-installing the gear (labeled "6"), be sure to install the washer on the shaft first.

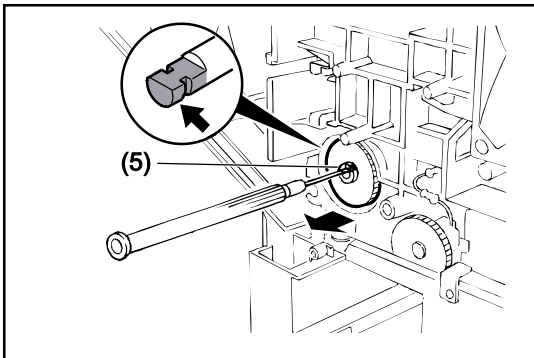
Note:

Apply KS-660 Conductive Grease to the Transfer Ground Spring (649) or to the end of the Feed Roller Shaft (618), Page 45.

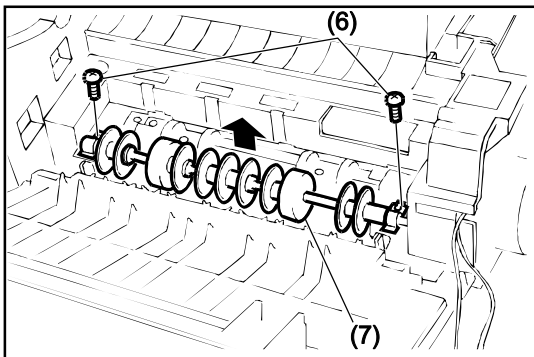
2.12. Laser Unit (429), Feed Roller (618), Paper Feed Roller (746), Clutch Gear Assembly (660), Paper Feed Solenoid (744), Fan Unit (622)



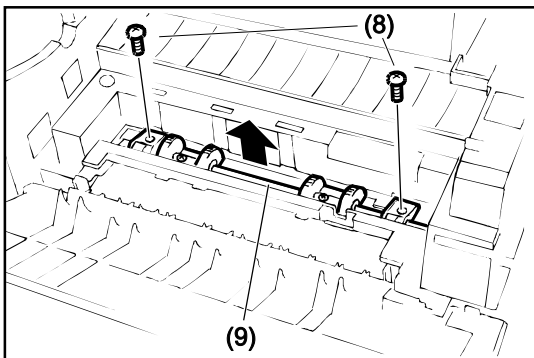
- (1) Remove the the Front Cover (105), Rear Cover (108) (Refer to 2.3.), Paper Guide Cover (110) (Refer to 2.4.), Control Panel Unit (Refer to 2.5.), and Motor Bracket and Gear Assembly (Refer to 2.11.).
- (2) Disconnect Connectors.
- (3) 2 Screws (19).
- (4) Remove the Laser Unit (429).



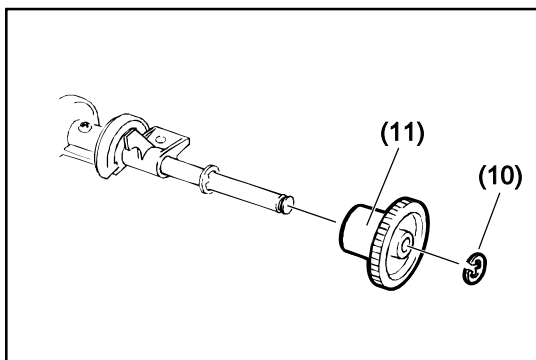
- (5) Remove the E34 Drive Gear (620).
- Note:**
When reassembling, apply KS-660 Conductive Grease to the end of the Feed Roller Shaft (618).



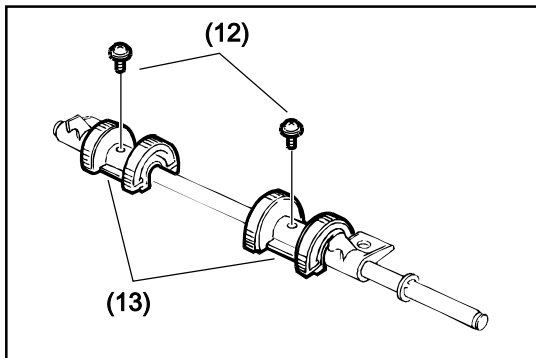
- (6) 2 Screws (19).
- (7) Remove the Feed Roller (618).



- (8) 2 Screws (19).
- (9) Remove the Paper Feed Roller Assembly.



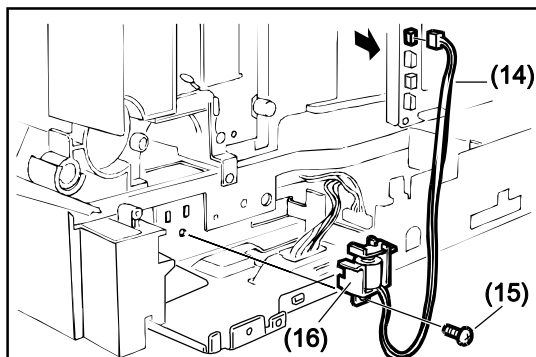
- (10) Remove the **E-Ring** (52).
- (11) Remove the **Clutch Gear Assembly** (660).



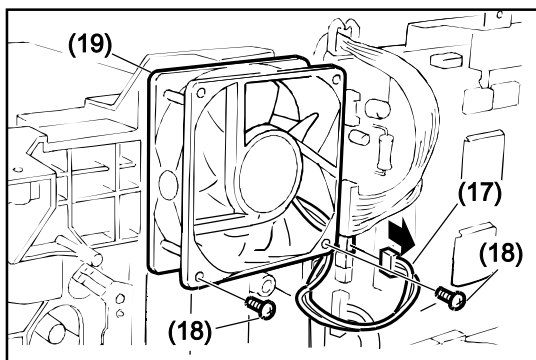
- (12) 2 **Screws** (23).
- (13) Remove the **Paper Feed Rollers** (746).

Note:

The Paper Feed Rollers can be accessed from the bottom of the machine after removing the Paper Cassette.

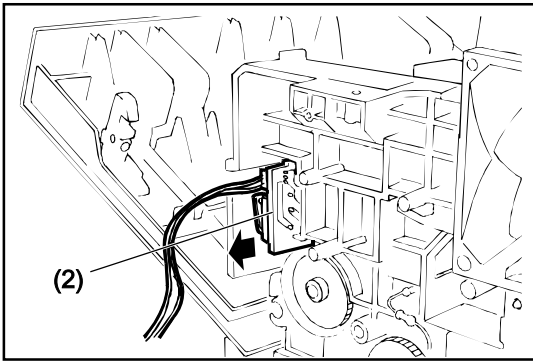


- (14) Disconnect **Connector CN55** on the LPC PC Board.
- (15) 1 **Screw** (19).
- (16) Remove the **Paper Feed Solenoid** (744).

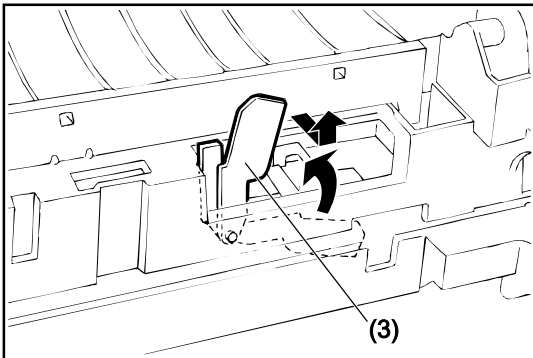


- (17) Disconnect **Connector CN54** on the LPC PC Board.
- (18) 2 **Screws** (1Y).
- (19) Remove the **Fan Unit** (622).

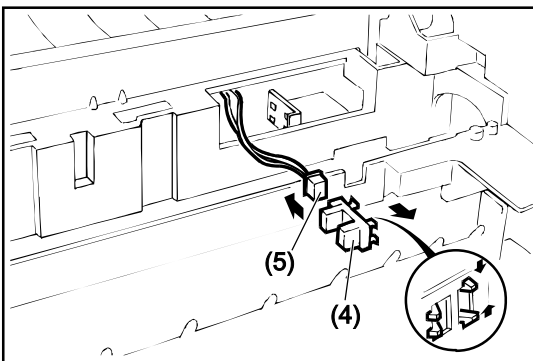
2.13. ILS PC Board (621), No Paper Actuator (609), Catch Magnet (730)



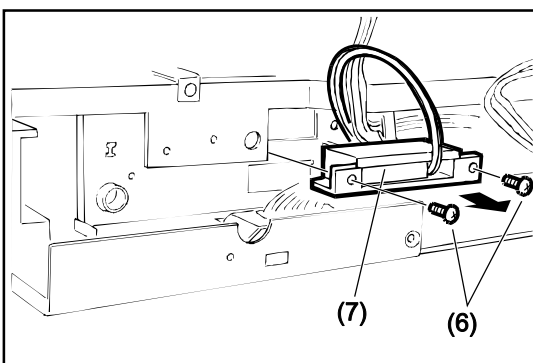
- (1) Remove the the **Front Cover (105)**, **Rear Cover (108)** (Refer to 2.3.), **Paper Guide Cover (110)** (Refer to 2.4.), **Control Panel Unit** (Refer to 2.5.), and **Motor Bracket and Gear Assembly** (Refer to 2.11.).
- (2) Remove the **ILS PC Board (621)**.



- (3) Remove the **No Paper Actuator (609)**.

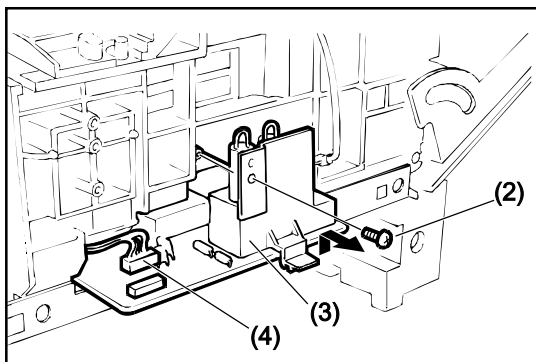


- (4) Remove the **Paper Sensor (610)**.
- (5) Pull out the Paper Sensor from the rear, and disconnect the **Connector**.

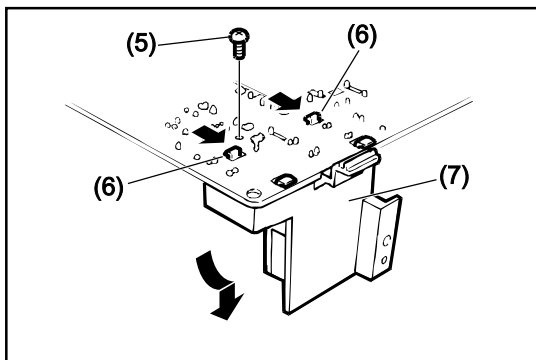


- (6) **2 Screws (19)**.
- (7) Remove the **Catch Magnet (730)**.

2.14. High Voltage Power Supply (HVPS) (506)




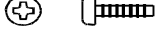
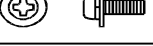
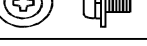
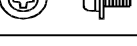
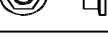




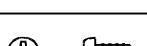
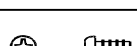
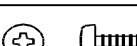

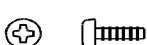



- (1) Remove the **Front Cover** (105) (Refer to 2.3.).
- (2) **1 Screw** (19).
- (3) Pull out the **High Voltage Power Supply (HVPS)** (506).
- (4) Disconnect **Connector CN39** on the High Voltage Power Supply (HVPS).



- (5) **1 Screw** (19).
- (6) Release 2 Latch Hooks.
- (7) Remove the **High Voltage Terminal Cover** (503).

2.15. Screw Identification Template

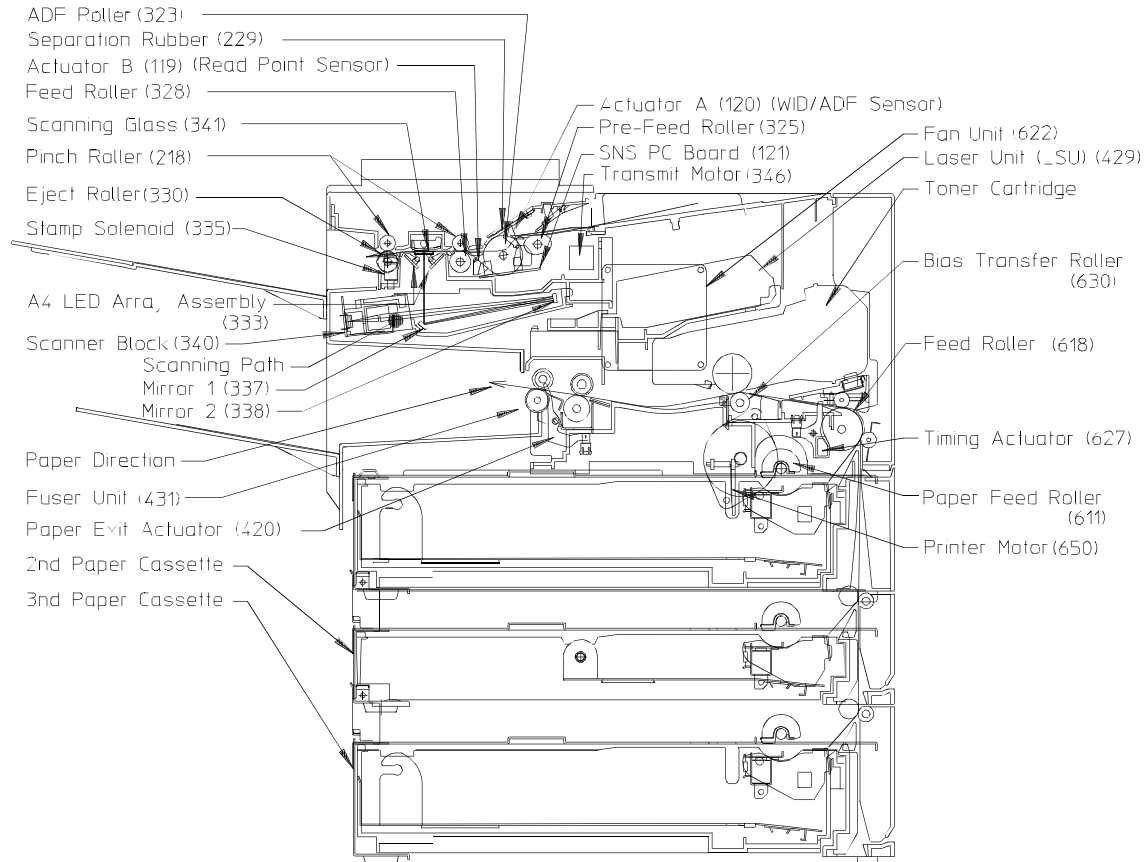
Ref No.	Part No.	Figure	Remark
1 1	XYN3+F 12		Screw
1 9	XTB3+8J		Screw
1 Q	XYN3+F 10		Screw
1 Y	XTB3+10J		Screw
2 3	XYN3+F 8		Screw
3 5	XYN4+F 6		Screw
3 6	XYN3+F 6		Screw
4 30	DZPF000001		Nut
4 N	XSN3+W8FC		Screw
5 Y	XUC4		E-Ring
5 Z	XUC6		E-Ring
6 52	DZPK000001		Washer
6 L	DZPB000014		Screw
7 B	XTB26+6J		Screw
9 H	XTN26+6J		Screw
B 1	DZPB000007		Screw
C 8	XTW3+8SFC		Screw
-	DZPA000013		Red Colored Screw

3 Maintenance, Adjustments and Check Points

3.1. Required Tools

No.	Tool	No.	Tool
1	Soft Cloth	7	Pliers
2	Isopropyl Alcohol	8	Cotton Swab
3	Phillips Screwdriver (#2)	9	Brush
4	Stubby Phillips Screwdriver (#2)	10	KS-660 - Conductive Grease
5	Blade-tip Screwdriver (3/32 in)	11	Molykote EM-502L Grease (Dow Corning)
6	Tweezer		

3.2. Periodic Maintenance Points



3.3. Periodic Maintenance Check List

The chart outlined below is a general guideline for maintenance. The example list is for an average usage of 50 transmitted and received documents per day. Needless to say, the environmental conditions and actual use will vary these factors.

The chart below is for reference only.

Transmitting mechanism parts	Cleaning		Replacement / Adjustment	
	Cycle	Method	Cycle	Method
ADF Roller (323)	3 months	Page 31	3-5 years(30,000 documents)	Page 34
Separation Rubber (229)	3 months	Page 25	1-3 years(10,000 documents)	Page 25
Pre-Feed Roller (325)	3 months	Page 31	3-5 years(30,000 documents)	Page 34
Mirrors (337 and 338)	12 months	Page 32	-	-
Verification Stamp (336)	-	-	5,000 documents	Page 32
Feed Roller (328)	3 months	Page 31	3-5 years(30,000 documents)	Page 34
Transmit Motor (346)	-	-	5 years	Page 34
Eject Roller (330)	3 months	Page 31	3-5 years(30,000 documents)	Page 34
Latch (302)	12 months	-	-	-
Toner Cartridge	-	-	10,000 pages (See Note)	-
Feed Roller (618)	12 months or 10,000 documents	Alcohol	-	Page 45
Clutch Gear Assembly (660)	12 months or 10,000 documents	Alcohol	-	Page 45
Paper Feed Solenoid (744)	12 months or 10,000 documents	Alcohol	-	Page 45
Bias Transfer Roller (630)	12 months or 10,000 documents	-	30,000 documents	Page 37
Fuser Unit (431)	When replacing Print Cartridge	Cleaning chart	50,000 documents	Page 39
Paper Feed Roller (746)	12 months or 10,000 documents	Alcohol	30,000 documents	Page 45
Fuser Lamp (408)	-	-	50,000 documents or 2-5 years	Page 39
Fuser Roller (414)	12 months or 10,000 documents	Alcohol	-	Page 41
Pressure Roller (409)	12 months or 10,000 documents	Alcohol	-	Page 41
Fan Unit (622)	-	-	3-5 years	Page 45
Printer Motor (650)	-	-	5 years	Page 43

Note: The number of pages is based on the ITU-T Image No. 1 test chart at Standard resolution and Multi-Copy mode.

3.4 Updating the Firmware

Unlike other machines with removable EPROM (Erasable Programmable ROM), this machine is equipped with an F-ROM (Flash ROM). F-ROM offers the flexibility of quick and easy firmware updates, creation of a master firmware card, backup and restore of firmware and machine parameters.

The following is the basic procedure to update the firmware of the machine. The details are described in the Firmware Update Kit User's Guide. (Order No.: UE-406053 and UE-406055)

3.4.1 Creating a Master Firmware Card

A. Utilizing the Firmware Update Kit.

1. Install the Firmware Update Kit.
2. Install a Flash Memory Card (2 MB or higher) into the machine.
3. Follow the instructions included in the Firmware Update Kit User's Guide.

B. Copy the Firmware from an Existing Machine

1. Turn the Power Switch to the OFF (O) position.
2. Install a Flash Memory Card (2 MB or higher) into the machine.
3. Turn the Power Switch to the ON (I) position.
4. Perform the Service Mode 9-2 (Firmware Backup).
5. The firmware is copied into the Flash Memory Card.
6. After the backup is completed, press "STOP" to return to standby.
7. Turn the Power Switch to the OFF (O) position.
8. Remove the Master Firmware Card that you just created from the machine.
9. Turn the Power Switch to the ON (I) position.
10. Use this Master Firmware Card to update the firmware on other machines.

3.4.2 Updating the Firmware using the Master Firmware Card

1. Before starting, print the Fax and Function Parameter Lists.
2. Turn the Power Switch to the OFF (O) position.
3. Install the appropriate Master Firmware Card into the machine.
4. Turn the Power Switch to the ON (I) position.
5. Perform the Service Mode 9-1 (Firmware Update).
6. The firmware is copied into the machine.
7. After the update is completed, the machine reboots itself and returns to standby.
8. Perform the Service Mode 6 (Parameter Initialization).
9. Turn the Power Switch to the OFF (O) position.
10. Remove the Master Firmware Card from the machine.
11. Turn the Power Switch to the ON (I) position.
12. Reprogram the Fax and/or Function Parameters according to the lists printed in Step 1 above if the settings are other than factory default.

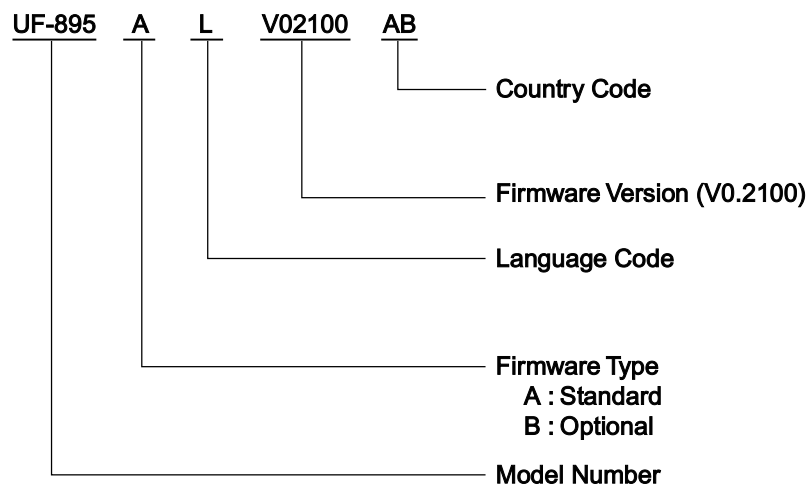
3.4.3 Erasing the Master Firmware Card

1. Turn the Power Switch to the OFF (O) position.
2. Install the Master Firmware Card into the machine.
3. Turn the Power Switch to the ON (I) position.
4. Perform the Service Mode 9-5 (PC → Flash Card).
5. The firmware is erased from the card and the following message is shown on the display:

READY TO PROGRAM PRESS SET TO START
--

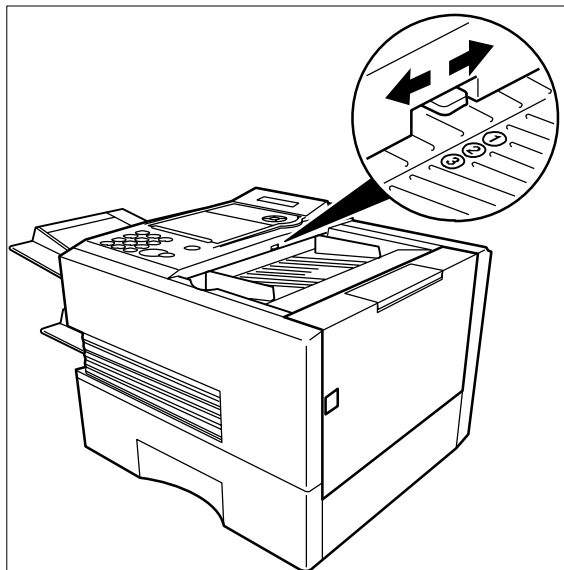
6. Press "STOP" twice to return to standby.
7. Turn the Power Switch to the OFF (O) position.
8. Remove the blank Flash Memory Card from the machine.
9. Turn the Power Switch to the ON (I) position.

3.4.4 Firmware Version



3.5. ADF Pressure

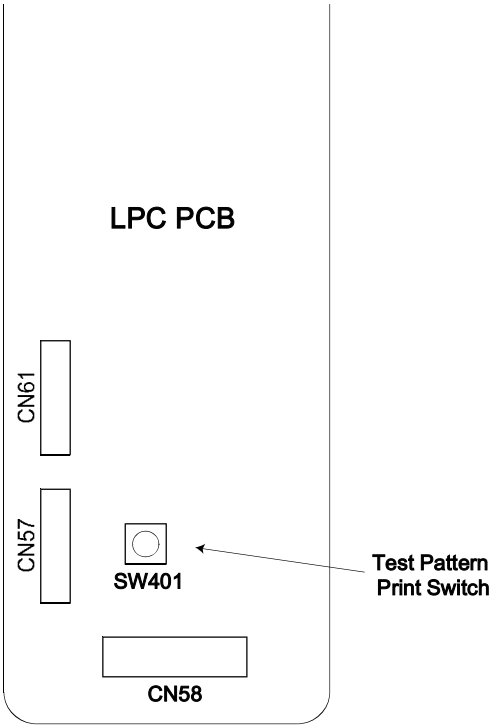
- When documents multi-feed, move the pressure Adjusting Lever to the 3 (H) position.
- When documents do not feed properly, move the Pressure Adjusting Lever to the 1 (L) position.



Position	Pressure of separator	Situation
1 (L)	Low	When the documents misfeed
2 (M)	Medium	Normal Position (Factory set position)
3 (H)	High	When the documents multi-feed

3.6. Printer Unit Test

- 1. You can check the printer with the FCB PCB disconnected from the unit (see Page 28).
- 2. Press the Test Pattern Print Switch (SW401) on the LPC PCB as shown below.

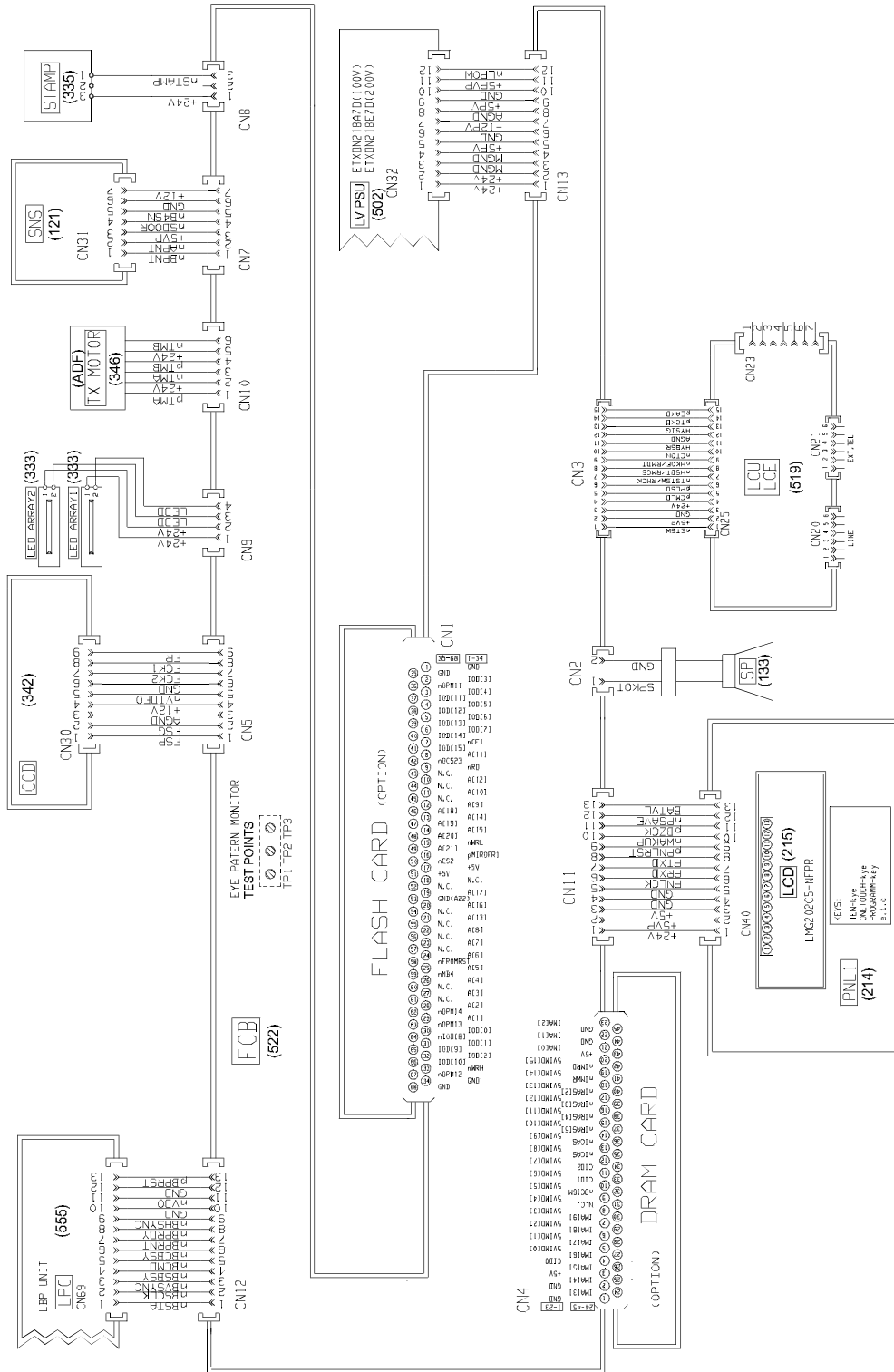


	Pattern	Selection method	Stop method
Pattern 0	1-dot Horizontal line	Switch ON for less than 2 seconds (400 dpi printing)	Switch ON again for less than 2 seconds
Pattern 1	Blank page	Switch ON for 2 seconds or more while Pattern 0 is printing (600 dpi printing)	Switch ON again for less than 2 seconds

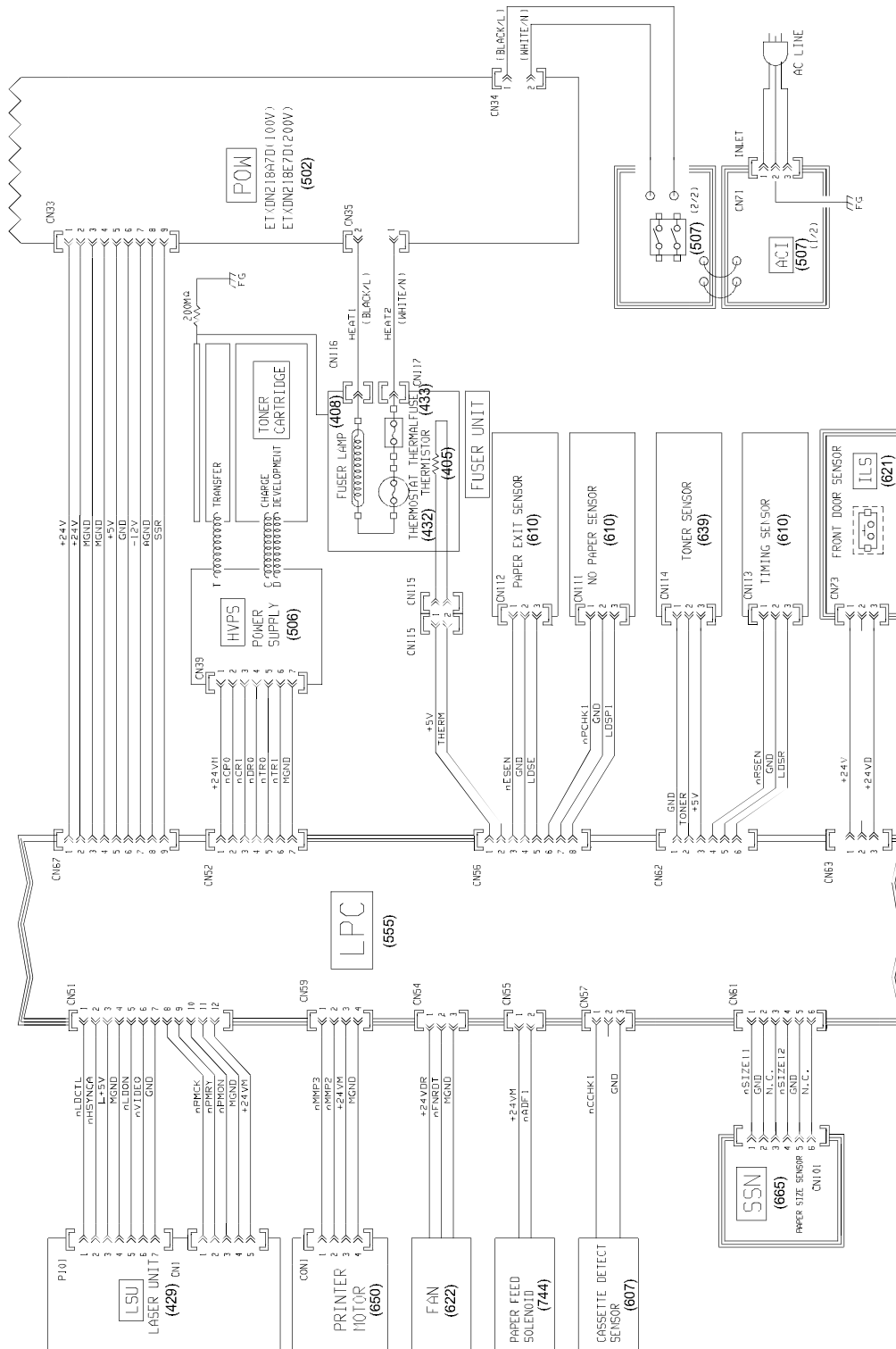
- 3. The Test Pattern prints. Check the print Quality.

3.7. General Circuit Diagram

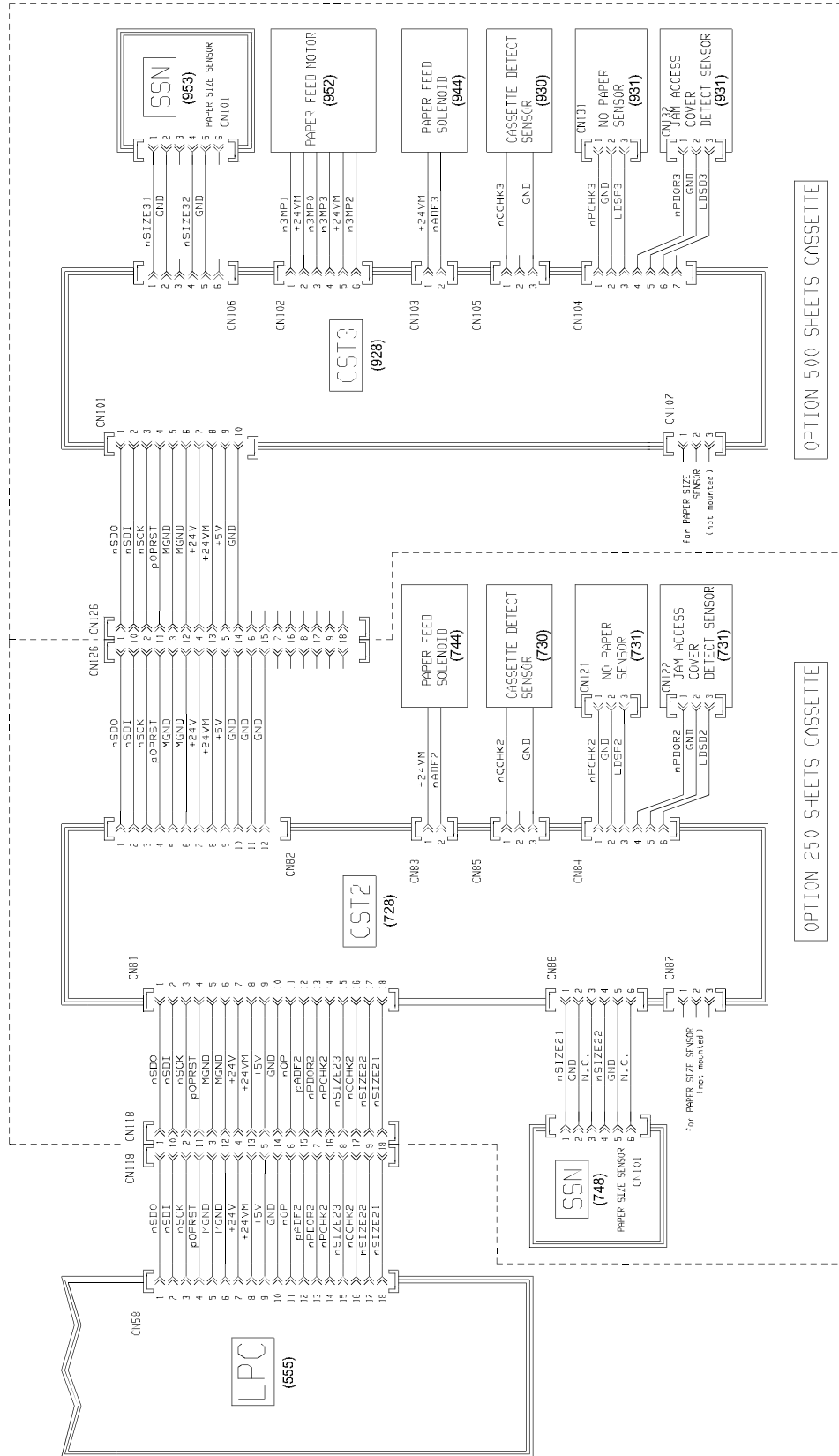
3.7.1. Fax Circuit



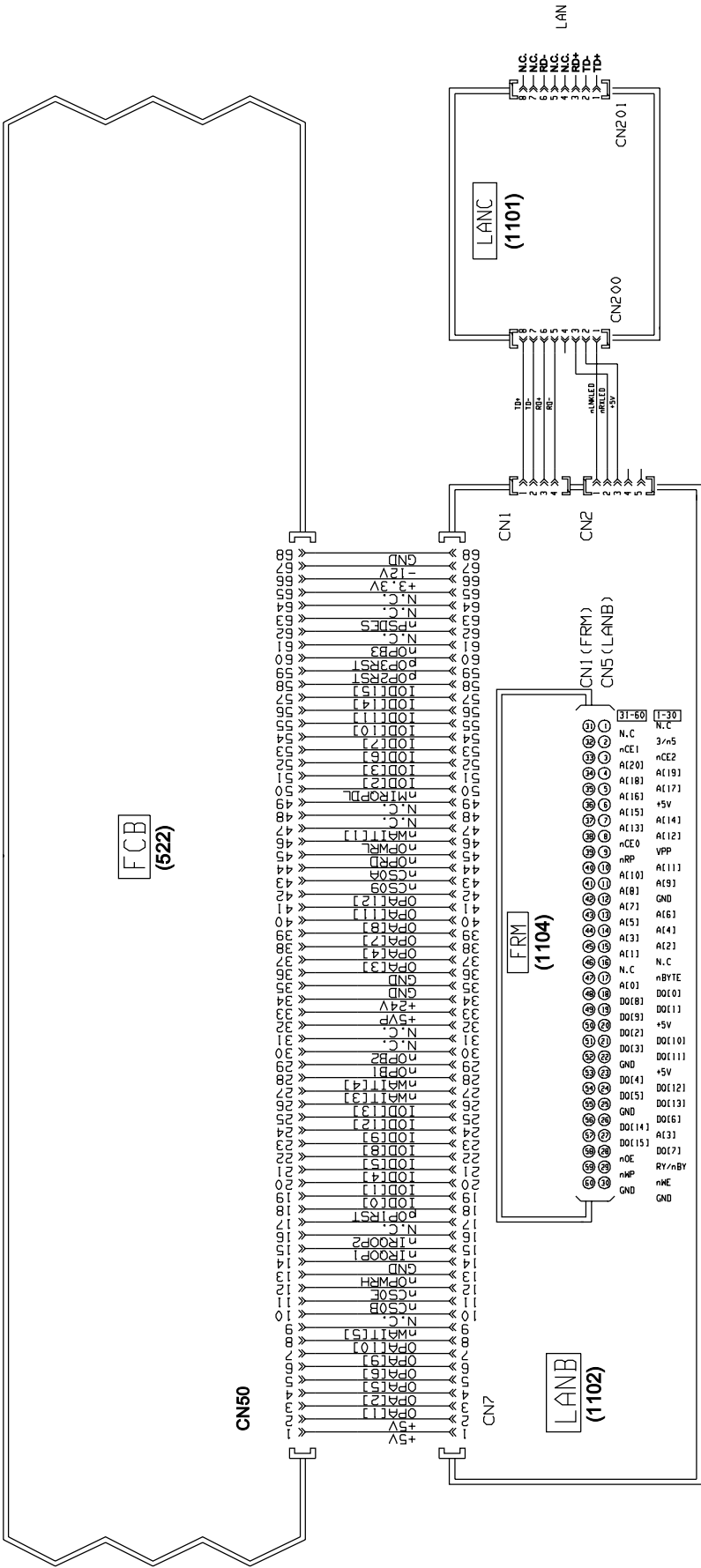
3.7.2. Printer Circuit



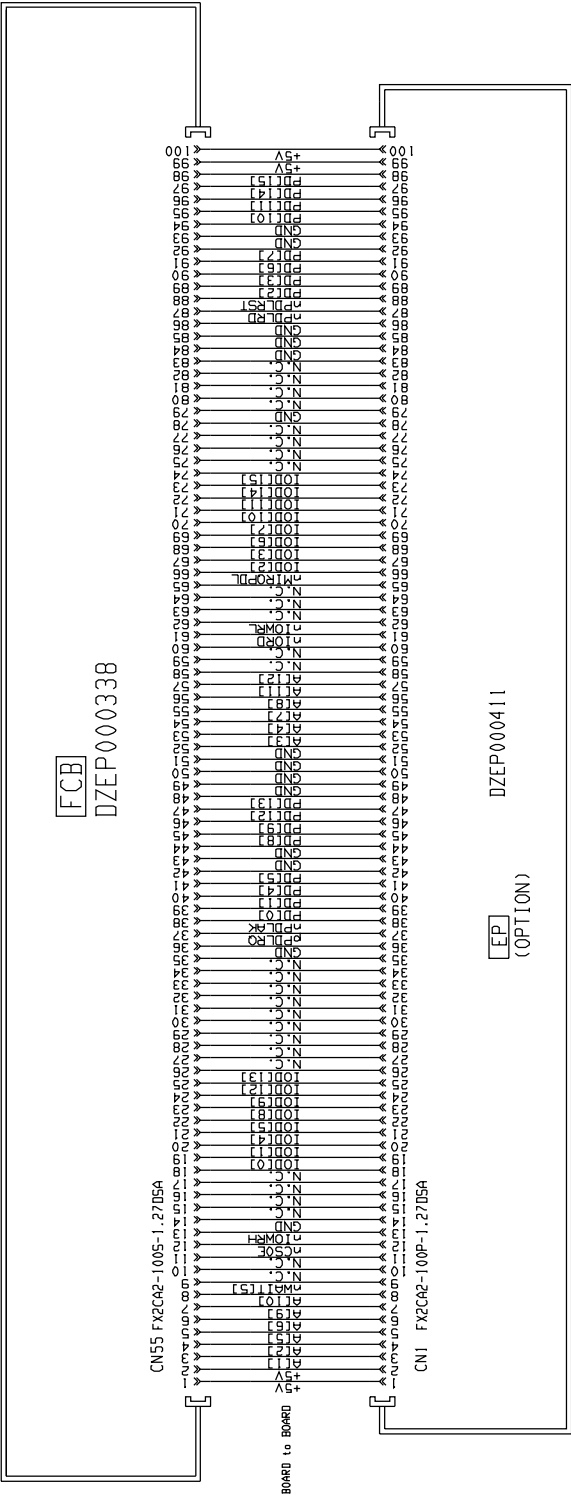
3.7.3. Option Cassette Circuit



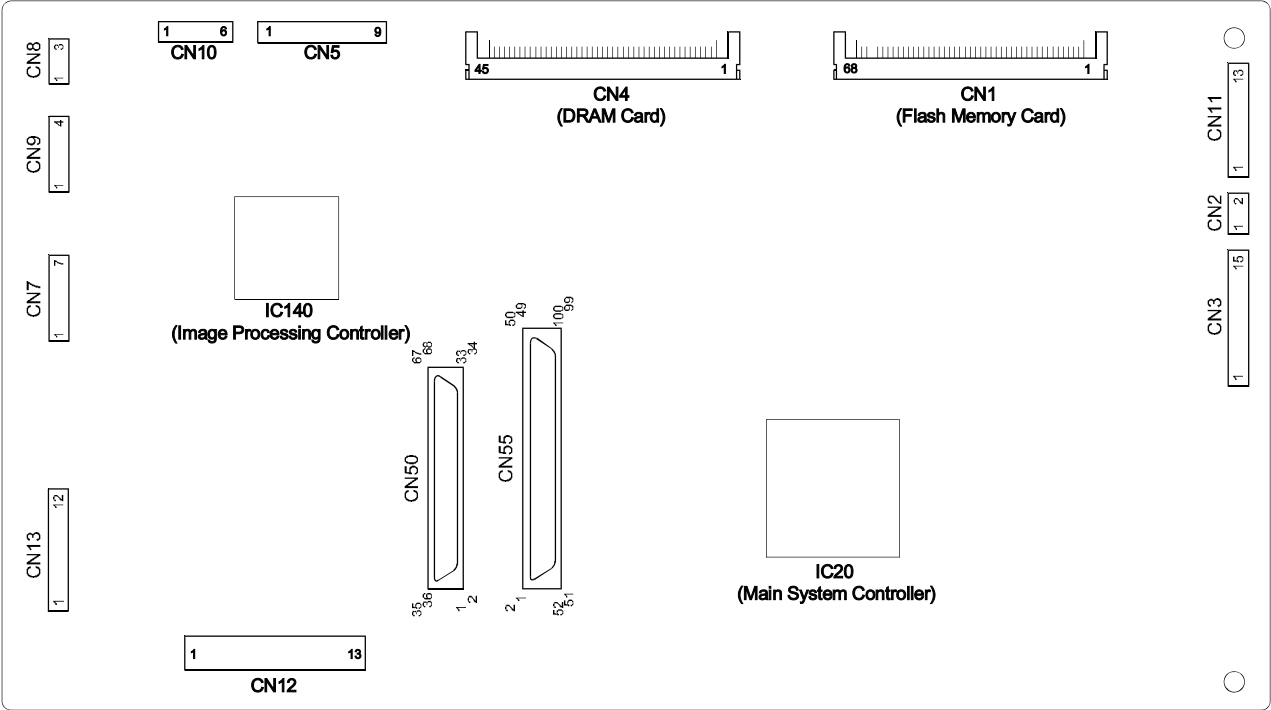
3.7.4. LAN Control Circuit



3.7.5 Page Description Language Printer Interface Kit


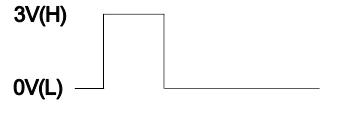
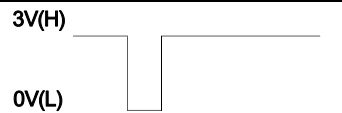
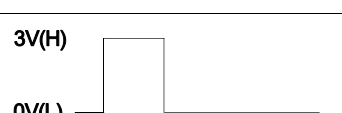

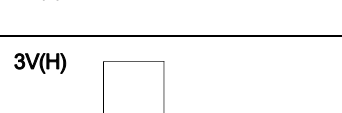

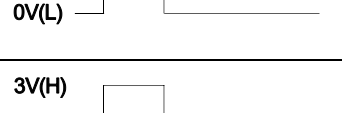
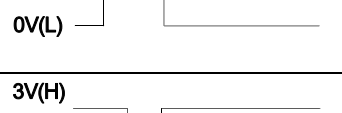
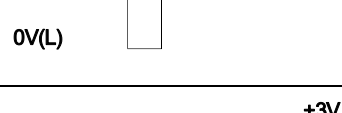

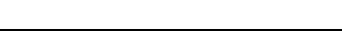


3.8. FCB PCB

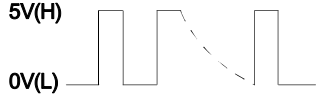
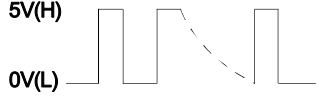
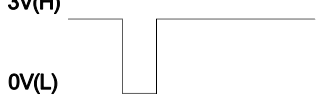

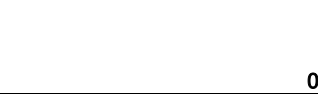
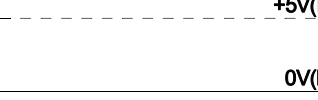
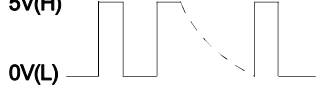

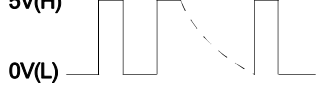
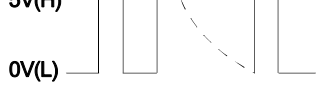
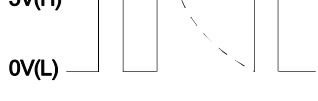
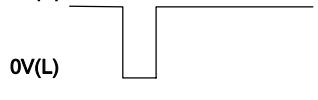


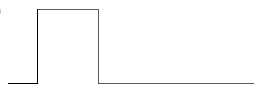
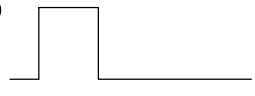
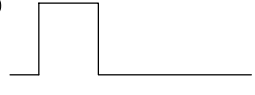





CN1

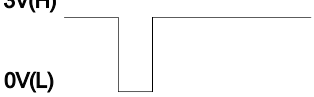
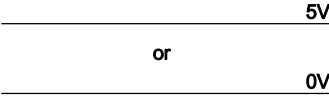
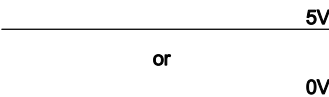
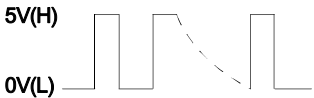
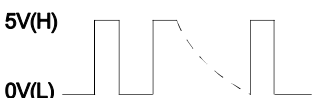

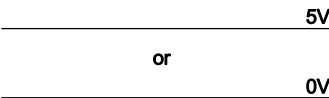
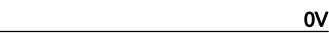
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-1	GND	Flash Memory Card		Ground
CN1-2	IOD[3]	Flash Memory Card		Data Signal
CN1-3	IOD[4]	Flash Memory Card		Data Signal
CN1-4	IOD[5]	Flash Memory Card		Data Signal
CN1-5	IOD[6]	Flash Memory Card		Data Signal
CN1-6	IOD[7]	Flash Memory Card		Data Signal

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-7	+5V(*CE1)	Flash Memory Card		+5 VDC Power Supply
CN1-8	A[11]	Flash Memory Card		Address Signal
CN1-9	nRD	Flash Memory Card		Low Enable
CN1-10	A[12]	Flash Memory Card		Address Signal
CN1-11	A[10]	Flash Memory Card		Address Signal
CN1-12	A[9]	Flash Memory Card		Address Signal
CN1-13	A[14]	Flash Memory Card		Address Signal
CN1-14	A[15]	Flash Memory Card		Address Signal
CN1-15	nWRL	Flash Memory Card		Low Enable
CN1-16	pMIRQFR1	Flash Memory Card		High Enable
CN1-17	+5V	Flash Memory Card		+5 VDC Power Supply
CN1-18	+12V	Flash Memory Card		+12 VDC Power Supply



Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-19	A[17]	Flash Memory Card		Address Signal
CN1-20	A[16]	Flash Memory Card		Address Signal
CN1-21	A[13]	Flash Memory Card		Address Signal
CN1-22	A[8]	Flash Memory Card		Address Signal
CN1-23	A[7]	Flash Memory Card		Address Signal
CN1-24	A[6]	Flash Memory Card		Address Signal
CN1-25	A[5]	Flash Memory Card		Address Signal
CN1-26	A[4]	Flash Memory Card		Address Signal
CN1-27	A[3]	Flash Memory Card		Address Signal
CN1-28	A[2]	Flash Memory Card		Address Signal
CN1-29	A[1]	Flash Memory Card		Address Signal
CN1-30	IOD[0]	Flash Memory Card		Data Signal

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-31	IOD[1]	Flash Memory Card		Data Signal
CN1-32	IOD[2]	Flash Memory Card		Data Signal
CN1-33	nWRH	Flash Memory Card		Low Enable
CN1-34	GND	Flash Memory Card		Ground
CN1-35	GND	Flash Memory Card		Ground
CN1-36	nOPM11	Flash Memory Card		H : Card Not Installed L : Card Installed
CN1-37	IOD[11]	Flash Memory Card		Data Signal
CN1-38	IOD[12]	Flash Memory Card		Data Signal
CN1-39	IOD[13]	Flash Memory Card		Data Signal
CN1-40	IOD[14]	Flash Memory Card		Data Signal
CN1-41	IOD[15]	Flash Memory Card		Data Signal
CN1-42	nCS23	Flash Memory Card		Low Enable


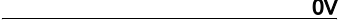
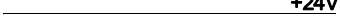
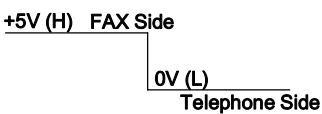
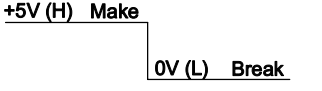
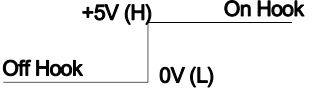
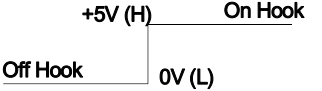
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-43	NC			Not Used
CN1-44	RSV	Flash Memory Card		Not Used
CN1-45	RSV	Flash Memory Card		Not Used
CN1-46	A[18]	Flash Memory Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN1-47	A[19]	Flash Memory Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN1-48	A[20]	Flash Memory Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN1-49	A[21]	Flash Memory Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN1-50	nCS2	Flash Memory Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN1-51	+5V	Flash Memory Card	<div> <div>+5V</div>  </div>	+5 VDC Power Supply
CN1-52	+12V	Flash Memory Card	<div> <div>+12V</div>  </div>	+12 VDC Power Supply
CN1-53	GND(A22)	Flash Memory Card	<div> <div>0V</div>  </div>	Ground
CN1-54 ~ CN1-56	NC			Not Used

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-57	RSV	Flash Memory Card		Not Used
CN1-58	nFROMRST	Flash Memory Card		Low Enable
CN1-59	NC			Not Used
CN1-60	RSV	Flash Memory Card		Not Used
CN1-61	NC			Not Used
CN1-62	nOPM14	Flash Memory Card		Flash Memory Card ID
CN1-63	nOPM13	Flash Memory Card		Flash Memory Card ID
CN1-64	nIOD[8]	Flash Memory Card		Data Signal
CN1-65	IOD[9]	Flash Memory Card		Data Signal
CN1-66	IOD[10]	Flash Memory Card		Data Signal
CN1-67	nOPM12	Flash Memory Card		Flash Memory Card ID
CN1-68	GND	Flash Memory Card		Ground

CN2

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN2-1	SPKOT	Speaker		Line Signal, Key Tone, Ringer
CN2-2	GND	Speaker		Ground

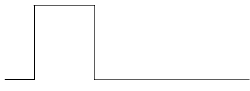
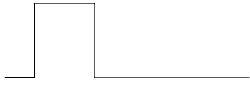
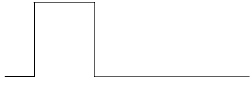
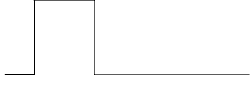


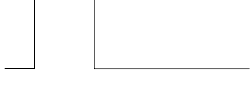


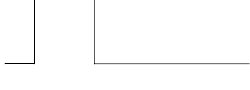
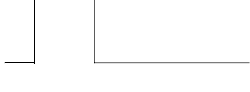
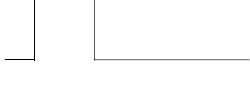
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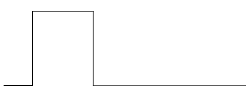
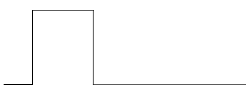
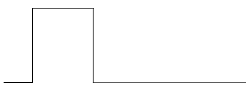
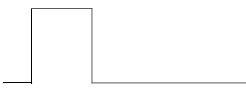
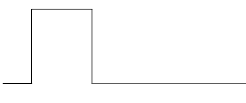
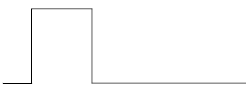
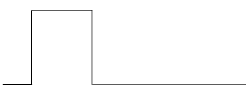

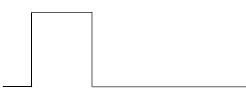
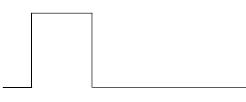

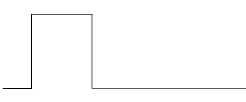
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN3-1	nETSW	LCU PCB CN25-1		Not Used
CN3-2	+5VP	LCU PCB CN25-2		+5 VDC Power Supply
CN3-3	GND	LCU PCB CN25-3		Ground
CN3-4	+24V	LCU PCB CN25-4		+24 VDC Power Supply
CN3-5	pCMLD	LCU PCB CN25-5		Line Switching Relay Drive
CN3-6	pPLSD	LCU PCB CN25-6		Pulse Dial Relay Drive
CN3-7	nTSTSW/RMCK	LCU PCB CN25-7		Not Used
CN3-8	nHSDT/RMCS	LCU PCB CN25-8		Handset Off-Hook Detection Signal
CN3-9	nHKOF/RMDT	LCU PCB CN25-9		External Phone Off-Hook Detection Signal (Phone Line must be connected.)

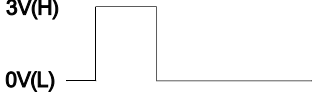
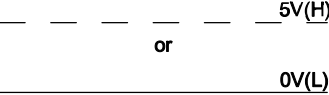
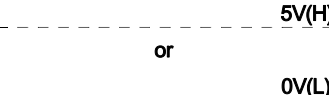
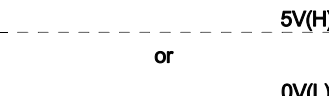
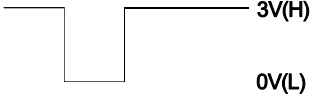
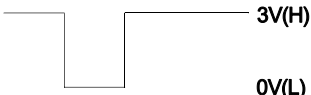
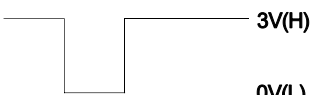
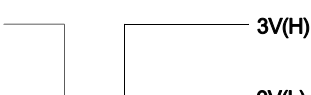

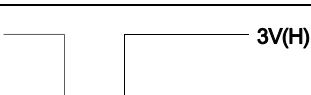
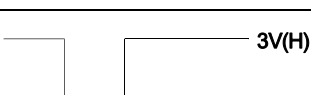
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN3-10	nCTON	LCU PCB CN25-10	H= Standby Mode, L= Ring in	Ring Detection Signal
CN3-11	HYBSR	LCU PCB CN25-11		Line Transformer Input Signal
CN3-12	GND	LCU PCB CN25-12	0V	Ground
CN3-13	HYSIG	LCU PCB CN25-13		Not Used
CN3-14	pTCKD	LCU PCB CN25-14		Not Used
CN3-15	pEAKD	LCU PCB CN25-15		Not Used

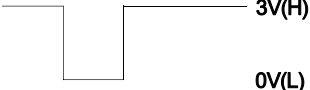



CN4

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN4-1	GND	DRAM Card	0V	Ground
CN4-2	GND	DRAM Card	0V	Ground
CN4-3	+5V	DRAM Card	+5V	+5 VDC Power Supply
CN4-4	CID0	DRAM Card	+5V(H) 0V(L)	H : Card Not Installed L : Card Installed
CN4-5	5VIMD[0]	DRAM Card	5V(H) 0V(L)	Data Signal

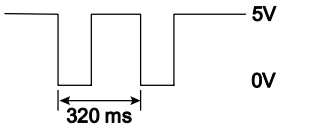
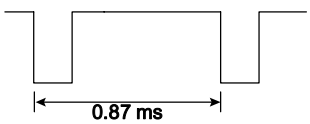


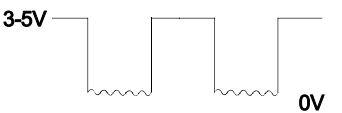

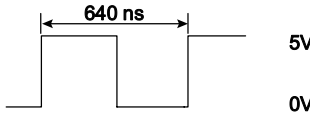
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN4-6	5VIMD[1]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-7	5VIMD[2]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-8	5VIMD[3]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-9	5VIMD[4]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-10	5VIMD[5]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-11	5VIMD[6]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-12	5VIMD[7]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-13	5VIMD[8]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-14	5VIMD[9]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-15	5VIMD[10]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-16	5VIMD[11]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-17	5VIMD[12]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal

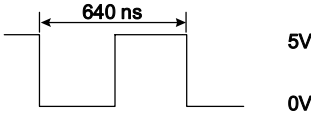
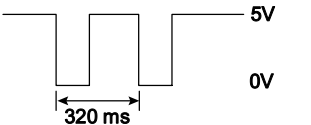
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN4-18	5VIMD[13]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-19	5VIMD[14]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-20	5VIMD[15]	DRAM Card	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN4-21	IMA[0]	DRAM Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN4-22	IMA[1]	DRAM Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN4-23	IMA[2]	DRAM Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN4-24	IMA[3]	DRAM Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN4-25	IMA[4]	DRAM Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN4-26	IMA[5]	DRAM Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN4-27	IMA[6]	DRAM Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN4-28	IMA[7]	DRAM Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN4-29	IMA[8]	DRAM Card	<div> <div>3V(H)</div> <div>0V(L)</div>  </div>	Address Signal

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN4-30	IMA[9]	DRAM Card		Address Signal
CN4-31	NC			Not Used
CN4-32	nDC16M	DRAM Card		DRAM Card ID
CN4-33	CID1	DRAM Card		DRAM Card ID
CN4-34	CID2	DRAM Card		DRAM Card ID
CN4-35	nICAS	DRAM Card		Low Enable
CN4-36	nICAS	DRAM Card		Low Enable
CN4-37	nIRAS[5]	DRAM Card		Low Enable
CN4-38	nIRAS[4]	DRAM Card		Low Enable
CN4-39	nIRAS[3]	DRAM Card		Low Enable
CN4-40	nIRAS[2]	DRAM Card		Low Enable
CN4-41	nIMWR	DRAM Card		Low Enable

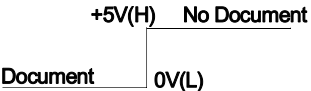
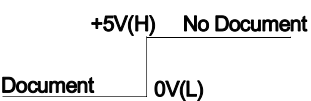

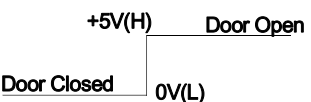
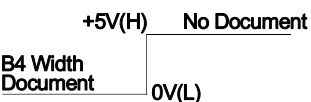
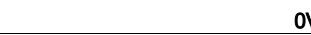
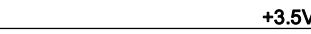
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN4-42	nIMRD	DRAM Card		Low Enable
CN4-43	+5V	DRAM Card		+5 VDC Power Supply
CN4-44	GND	DRAM Card		Ground
CN4-45	GND	DRAM Card		Ground

CN5

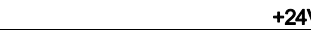
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN5-1	FSR	CCD PCB CN30-1		Sampling Clock
CN5-2	FSG	CCD PCB CN30-2		Data Transfer Enable Signal
CN5-3	AGND	CCD PCB CN30-3		Ground
CN5-4	+12V	CCD PCB CN30-4		+12 VDC Power Supply
CN5-5	nVIDEO	CCD PCB CN30-5		Video Signal
CN5-6	GND	CCD PCB CN30-6		Ground
CN5-7	FCK2	CCD PCB CN30-7		Shift Register Clock 2

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN5-8	FCK1	CCD PCB CN30-8		Shift Register Clock 1
CN5-9	FR	CCD PCB CN30-9		Reset Signal

CN7

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN7-1	nBPNT	SNS PCB CN31-1		Read Point Detection
CN7-2	nAPNT	SNS PCB CN31-2		ADF Document Detection
CN7-3	+5VP	SNS PCB CN31-3		+5 VDC Power Supply (Connector Unplugged) +1.2 VDC (Connector Plugged In)
CN7-4	nSDOOR	SNS PCB CN31-4		Tx Door Detection
CN7-5	nB4SN	SNS PCB CN31-5		B4 Width Document Detection
CN7-6	GND	SNS PCB CN31-6		Ground
CN7-7	+12V	SNS PCB CN31-7		+12 VDC Power Supply (Connector Unplugged) +3.5 VDC (Connector Plugged In)

CN8

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN8-1	+24V	Stamp		+24 VDC Power Supply

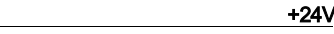
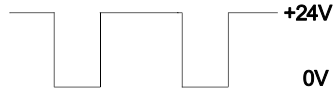
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN8-2	NC			Not Used
CN8-3	nSTAMP	Stamp		Stamp Driver Signal

CN9

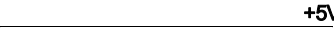
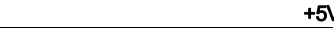


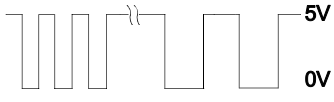
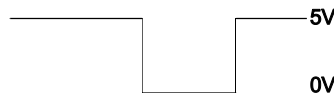
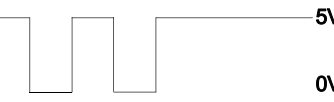
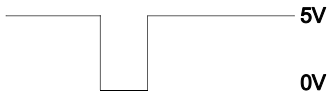
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN9-1	+24V	LED Array 1-1		+24 VDC Power Supply
CN9-2	+24V (For UF-895 only)	LED Array 2-1		+24 VDC Power Supply
CN9-3	LEDD (For UF-895 only)	LED Array 2-2		LED Lamp +24 VDC (Connector Unplugged) +12.5 VDC (Connector Plugged In)
CN9-4	LEDD	LED Array 1-2		LED Lamp +24 VDC (Connector Unplugged) +12.5 VDC (Connector Plugged In)

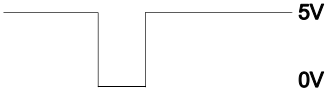
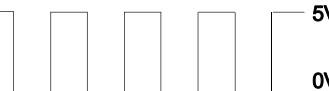
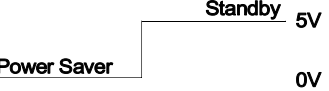
CN10

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN10-1	pTMA	Transmit Motor		Stepping Signal
CN10-2	+24V	Transmit Motor		+24 VDC Power Supply
CN10-3	nTMA	Transmit Motor		Stepping Signal
CN10-4	pTMB	Transmit Motor		Stepping Signal

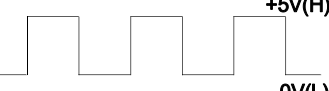
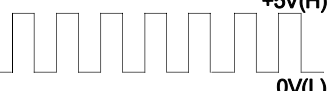
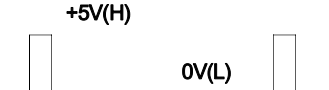
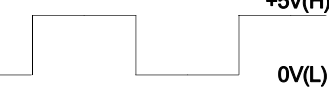
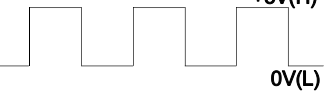
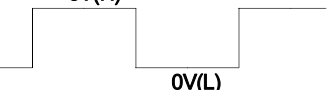
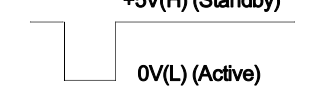
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN10-5	+24V	Transmit Motor		+24 VDC Power Supply
CN10-6	nTMB	Transmit Motor		Stepping Signal


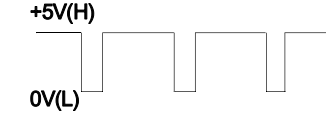

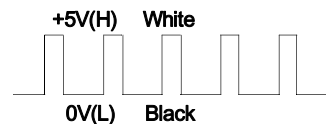


CN11

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN11-1	+24V	PNL PCB CN40-1		Not Used
CN11-2	+5VP	PNL PCB CN40-2		+5 VDC Power Supply
CN11-3	+5V	PNL PCB CN40-3		+5 VDC Power Supply
CN11-4	GND	PNL PCB CN40-4		Ground
CN11-5	GND	PNL PCB CN40-5		Ground
CN11-6	pPNLCK	PNL PCB CN40-6		Serial Data Transfer Clock
CN11-7	PNLRXD	PNL PCB CN40-7		Reception Data
CN11-8	PNLTXD	PNL PCB CN40-8		Transmission Data
CN11-9	pPNLRST	PNL PCB CN40-9		Panel Reset Signal (Reset by 0V)






Pin No.	Signal Name	Destination	Signal Waveform	Function
CN11-10	nWAKUP	PNL PCB CN40-10		Power Saver Reset Signal
CN11-11	pBZCK	PNL PCB CN40-11		Buzzer Clock
CN11-12	nPSAVE	PNL PCB CN40-12		Power Saver Enable
CN11-13	BATVL	PNL PCB CN40-13	0V ~ +3V	Battery Voltage


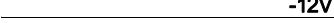



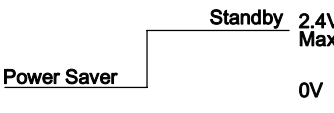
CN12

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN12-1	nBSTA	LPC PCB CN69-1		Serial Interface Data Signal
CN12-2	nBSCLK	LPC PCB CN69-2		Serial Interface Synchronization Clock
CN12-3	nBVSYNC	LPC PCB CN69-3		V-SYNC for Video Signal
CN12-4	nBSBSY	LPC PCB CN69-4		Serial Interface Enable Signal
CN12-5	nBCMD	LPC PCB CN69-5		Serial Interface Command Data Signal
CN12-6	nBCBSY	LPC PCB CN69-6		Serial Interface Enable Signal
CN12-7	nBPRNT	LPC PCB CN69-7		Print Request Signal



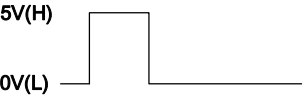
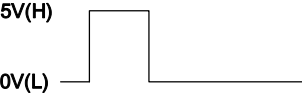
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN12-8	nBPRDY	LPC PCB CN69-8		Printer Ready Signal
CN12-9	nBHSYNC	LPC PCB CN69-9		H-SYNC for Video Signal
CN12-10	GND	LPC PCB CN69-10		Ground
CN12-11	nVDO	LPC PCB CN69-11		Laser Drive Print Data Signal
CN12-12	GND	LPC PCB CN69-12		Ground
CN12-13	pBPRST	LPC PCB CN69-13		Printer External Reset Signal

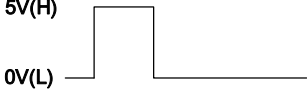
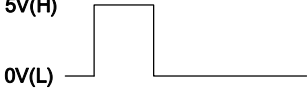
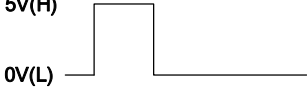
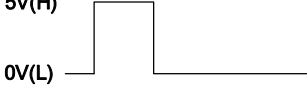
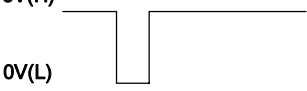




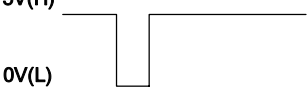
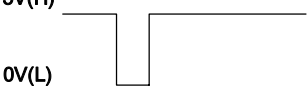
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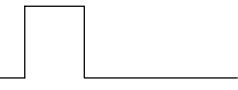
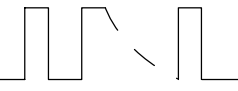
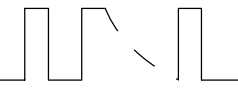
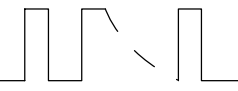
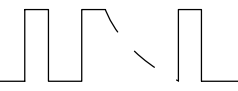
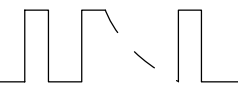
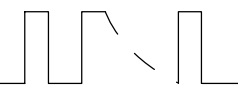
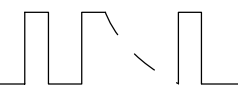
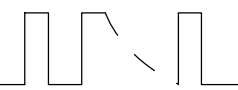
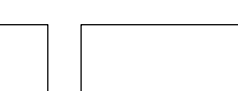
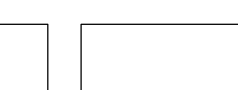
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN13-1	+24V	POW PCB CN32-1		+24 VDC Power Supply
CN13-2	+24V	POW PCB CN32-2		+24 VDC Power Supply
CN13-3	MGND	POW PCB CN32-3		Ground
CN13-4	MGND	POW PCB CN32-4		Ground
CN13-5	+5V	POW PCB CN32-5		+5 VDC Power Supply


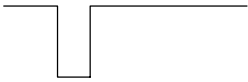




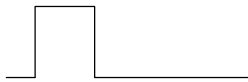
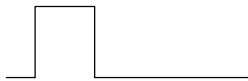
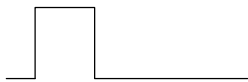
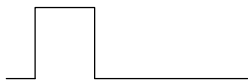
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN13-6	GND	POW PCB CN32-6		Ground
CN13-7	-12V	POW PCB CN32-7		-12 VDC Power Supply
CN13-8	AGND	POW PCB CN32-8		Ground
CN13-9	+5V	POW PCB CN32-9		+5 VDC Power Supply
CN13-10	GND	POW PCB CN32-10		Ground
CN13-11	+5VP	POW PCB CN32-11		Not Used
CN13-12	nLPOW	POW PCB CN32-12		Power Saver Enable

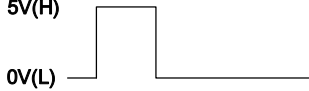
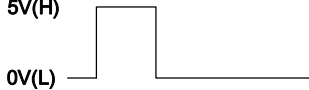
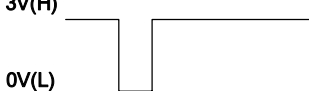





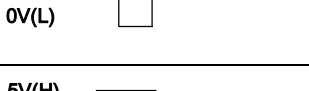
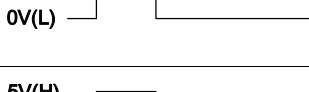
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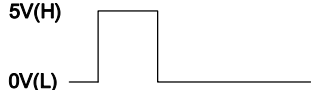
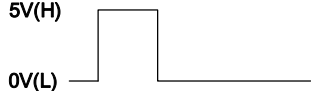
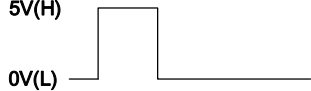
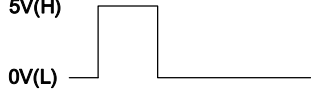
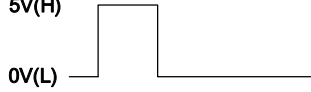
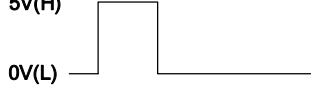
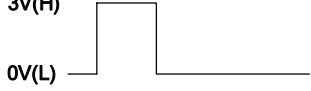
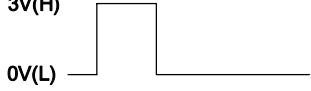
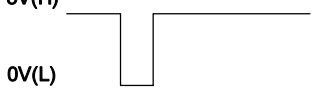
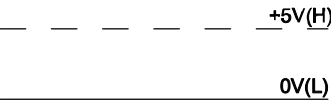
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN50-1	+5V	LANB PCB CN7-1		+5 VDC Power Supply
CN50-2	+5V	LANB PCB CN7-2		+5 VDC Power Supply
CN50-3	OPA[1]	LANB PCB CN7-3		Address Signal
CN50-4	OPA[2]	LANB PCB CN7-4		Address Signal




Pin No.	Signal Name	Destination	Signal Waveform	Function
CN50-5	OPA[5]	LANB PCB CN7-5		Address Signal
CN50-6	OPA[6]	LANB PCB CN7-6		Address Signal
CN50-7	OPA[9]	LANB PCB CN7-7		Address Signal
CN50-8	OPA[10]	LANB PCB CN7-8		Address Signal
CN50-9	nWAIT[5]	LANB PCB CN7-9		Low Enable
CN50-10	NC	LANB PCB CN7-10		Not Used
CN50-11	nCSOB	LANB PCB CN7-11		Low Enable
CN50-12	nCSOE	LANB PCB CN7-12		Low Enable
CN50-13	nOPWRH	LANB PCB CN7-13		Low Enable
CN50-14	GND	LANB PCB CN7-14		Ground
CN50-15	nIRQOP1	LANB PCB CN7-15		Low Enable
CN50-16	nIRQOP2	LANB PCB CN7-16		Low Enable

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN50-17	NC	LANB PCB CN7-17		Not Used
CN50-18	pOP1RST	LANB PCB CN7-18	3V(H) 0V(L) 	High Enable
CN50-19	IOD[0]	LANB PCB CN7-19	5V(H) 0V(L) 	Data Signal
CN50-20	IOD[1]	LANB PCB CN7-20	5V(H) 0V(L) 	Data Signal
CN50-21	IOD[4]	LANB PCB CN7-21	5V(H) 0V(L) 	Data Signal
CN50-22	IOD[5]	LANB PCB CN7-22	5V(H) 0V(L) 	Data Signal
CN50-23	IOD[8]	LANB PCB CN7-23	5V(H) 0V(L) 	Data Signal
CN50-24	IOD[9]	LANB PCB CN7-24	5V(H) 0V(L) 	Data Signal
CN50-25	IOD[12]	LANB PCB CN7-25	5V(H) 0V(L) 	Data Signal
CN50-26	IOD[13]	LANB PCB CN7-26	5V(H) 0V(L) 	Data Signal
CN50-27	nWAIT[3]	LANB PCB CN7-27	5V(H) 0V(L) 	Low Enable
CN50-28	nWAIT[4]	LANB PCB CN7-28	5V(H) 0V(L) 	Low Enable



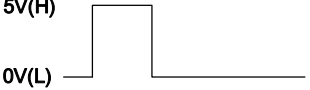
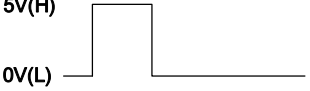
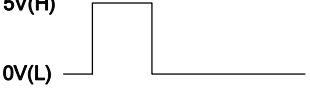


Pin No.	Signal Name	Destination	Signal Waveform	Function
CN50-29	nOPB1	LANB PCB CN7-29	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Low Enable
CN50-30	nOPB2	LANB PCB CN7-30	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Low Enable
CN50-31	NC	LANB PCB CN7-31		Not Used
CN50-32	NC	LANB PCB CN7-32		Not Used
CN50-33	+5VP	LANB PCB CN7-33	<div> <div>+5V</div>  </div>	+5 VDC Power Supply
CN50-34	+24V	LANB PCB CN7-34	<div> <div>+24V</div>  </div>	+24 VDC Power Supply
CN50-35	GND	LANB PCB CN7-35	<div> <div>0V</div>  </div>	Ground
CN50-36	GND	LANB PCB CN7-36	<div> <div>0V</div>  </div>	Ground
CN50-37	OPA[3]	LANB PCB CN7-37	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN50-38	OPA[4]	LANB PCB CN7-38	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN50-39	OPA[7]	LANB PCB CN7-39	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN50-40	OPA[8]	LANB PCB CN7-40	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal

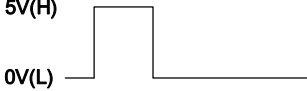
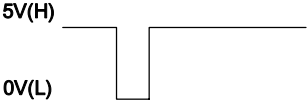
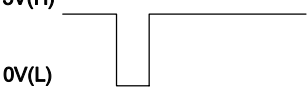
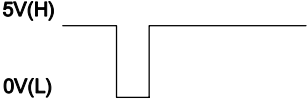

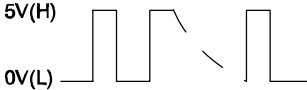
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN50-41	OPA[11]	LANB PCB CN7-41		Address Signal
CN50-42	OPA[12]	LANB PCB CN7-42		Address Signal
CN50-43	nCS09	LANB PCB CN7-43		Low Enable
CN50-44	nCS0A	LANB PCB CN7-44		Low Enable
CN50-45	nOPRD	LANB PCB CN7-45		Low Enable
CN50-46	nOPWRL	LANB PCB CN7-46		Low Enable
CN50-47	nWAIT[1]	LANB PCB CN7-47		Low Enable
CN50-48	NC	LANB PCB CN7-48		Not Used
CN50-49	NC	LANB PCB CN7-49		Not Used
CN50-50	nMIRQPD	LANB PCB CN7-50		Low Enable
CN50-51	IOD[2]	LANB PCB CN7-51		Address Signal
CN50-52	IOD[3]	LANB PCB CN7-52		Address Signal

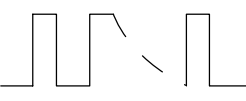
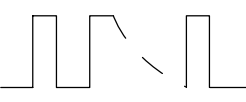
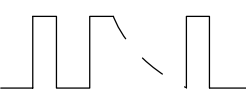
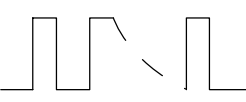
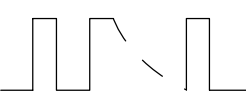
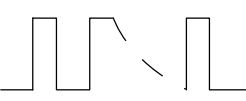
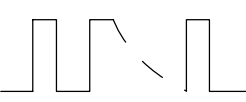
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN50-53	IOD[6]	LANB PCB CN7-53		Address Signal
CN50-54	IOD[7]	LANB PCB CN7-54		Address Signal
CN50-55	IOD[10]	LANB PCB CN7-55		Address Signal
CN50-56	IOD[11]	LANB PCB CN7-56		Address Signal
CN50-57	IOD[14]	LANB PCB CN7-57		Address Signal
CN50-58	IOD[15]	LANB PCB CN7-58		Address Signal
CN50-59	pOP2RST	LANB PCB CN7-59		High Enable
CN50-60	pOP3RST	LANB PCB CN7-60		High Enable
CN50-61	nOPB3	LANB PCB CN7-61		Low Enable
CN50-62	NC	LANB PCB CN7-62		Not Used
CN50-63	nPSDES	LANB PCB CN7-63		H: Option Not Installed L : Option Installed
CN50-64	NC	LANB PCB CN7-64		Not Used

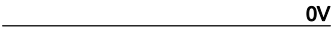
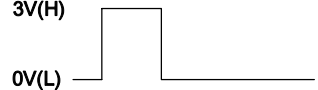
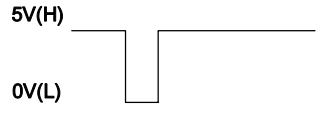
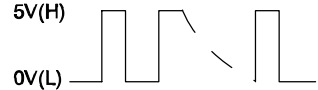

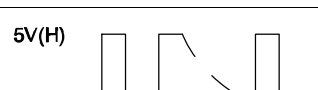


Pin No.	Signal Name	Destination	Signal Waveform	Function
CN50-65	NC	LANB PCB CN7-65		Not Used
CN50-66	+3.3V	LANB PCB CN7-66		+3.3 VDC Power Supply
CN50-67	-12V	LANB PCB CN7-67		-12 VDC Power Supply
CN50-68	GND	LANB PCB CN7-68		Ground


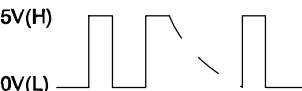
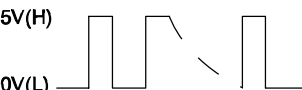

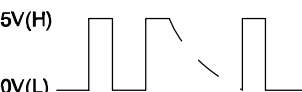




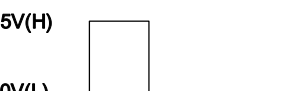

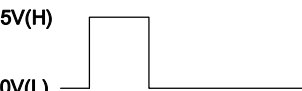
CN55

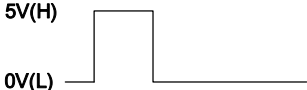
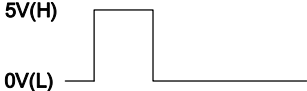
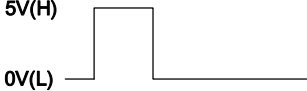
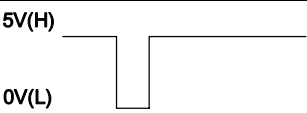
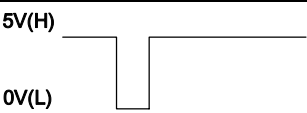
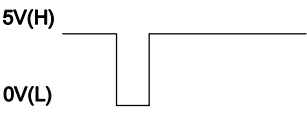
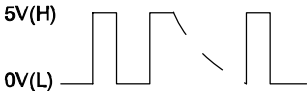
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-1	+5V	EP PCB CN1-1		+5 VDC Power Supply
CN55-2	+5V	EP PCB CN1-2		+5 VDC Power Supply
CN55-3	A[1]	EP PCB CN1-3		Address Signal
CN55-4	A[2]	EP PCB CN1-4		Address Signal
CN55-5	A[5]	EP PCB CN1-5		Address Signal
CN55-6	A[6]	EP PCB CN1-6		Address Signal
CN55-7	A[9]	EP PCB CN1-7		Address Signal

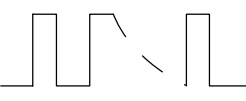
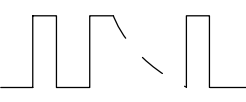
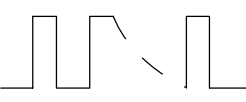
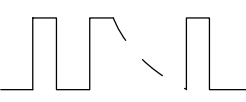
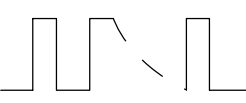
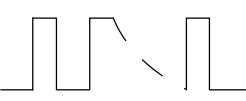
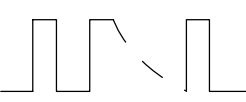

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-8	A[10]	EP PCB CN1-8		Address Signal
CN55-9	nWAIT[5]	EP PCB CN1-9		Low Enable
CN55-10	NC	EP PCB CN1-10		Not Used
CN55-11	NC	EP PCB CN1-11		Not Used
CN55-12	nCS0E	EP PCB CN1-12		Low Enable
CN55-13	nIOWRH	EP PCB CN1-13		Low Enable
CN55-14	GND	EP PCB CN1-14		Ground
CN55-15	NC	EP PCB CN1-15		Not Used
CN55-16	NC	EP PCB CN1-16		Not Used
CN55-17	NC	EP PCB CN1-17		Not Used
CN55-18	NC	EP PCB CN1-18		Not Used
CN55-19	IOD[0]	EP PCB CN1-19		Data Signal

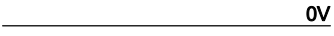
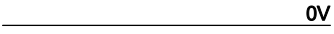

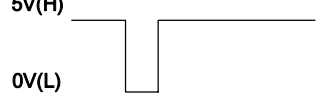
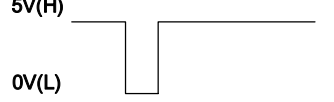
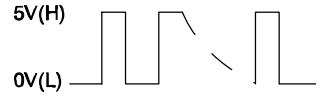
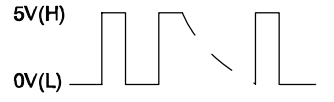
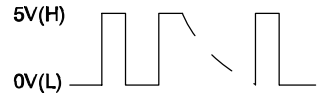
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-20	IOD[1]	EP PCB CN1-20	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-21	IOD[4]	EP PCB CN1-21	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-22	IOD[5]	EP PCB CN1-22	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-23	IOD[8]	EP PCB CN1-23	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-24	IOD[9]	EP PCB CN1-24	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-25	IOD[12]	EP PCB CN1-25	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-26	IOD[13]	EP PCB CN1-26	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-27	NC	EP PCB CN1-27		Not Used
CN55-28	NC	EP PCB CN1-28		Not Used
CN55-29	NC	EP PCB CN1-29		Not Used
CN55-30	NC	EP PCB CN1-30		Not Used
CN55-31	NC	EP PCB CN1-31		Not Used

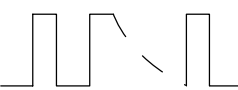


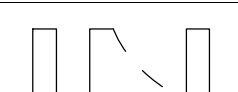
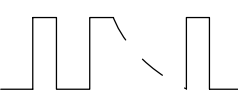

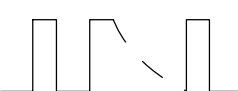


Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-32	NC	EP PCB CN1-32		Not Used
CN55-33	NC	EP PCB CN1-33		Not Used
CN55-34	NC	EP PCB CN1-34		Not Used
CN55-35	NC	EP PCB CN1-35		Not Used
CN55-36	GND	EP PCB CN1-36		Ground
CN55-37	pPDLRQ	EP PCB CN1-37		High Enable
CN55-38	nPDLAK	EP PCB CN1-38		Low Enable
CN55-39	PD[0]	EP PCB CN1-39		Data Signal
CN55-40	PD[1]	EP PCB CN1-40		Data Signal
CN55-41	PD[4]	EP PCB CN1-41		Data Signal
CN55-42	PD[5]	EP PCB CN1-42		Data Signal
CN55-43	GND	EP PCB CN1-43		Ground

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-44	GND	EP PCB CN1-44	 0V	Ground
CN55-45	PD[8]	EP PCB CN1-45		Data Signal
CN55-46	PD[9]	EP PCB CN1-46		Data Signal
CN55-47	PD[12]	EP PCB CN1-47		Data Signal
CN55-48	PD[13]	EP PCB CN1-48		Data Signal
CN55-49	GND	EP PCB CN1-49	 0V	Ground
CN55-50	GND	EP PCB CN1-50	 0V	Ground
CN55-51	GND	EP PCB CN1-51	 0V	Ground
CN55-52	GND	EP PCB CN1-52	 0V	Ground
CN55-53	A[3]	EP PCB CN1-53		Address Signal
CN55-54	A[4]	EP PCB CN1-54		Address Signal
CN55-55	A[7]	EP PCB CN1-55		Address Signal

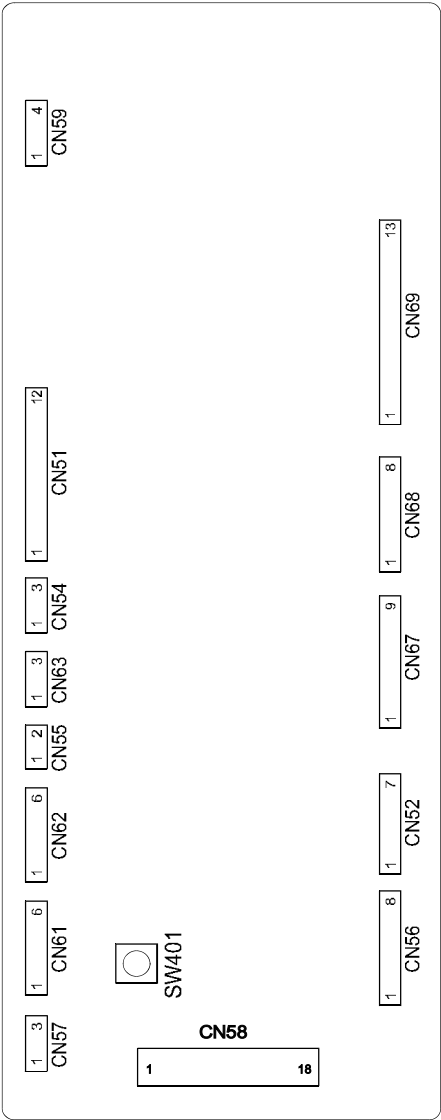
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-56	A[8]	EP PCB CN1-56		Address Signal
CN55-57	A[11]	EP PCB CN1-57		Address Signal
CN55-58	A[12]	EP PCB CN1-58		Address Signal
CN55-59	NC	EP PCB CN1-59		Not Used
CN55-60	NC	EP PCB CN1-60		Not Used
CN55-61	nIORD	EP PCB CN1-61		Low Enable
CN55-62	nIOWRL	EP PCB CN1-62		Low Enable
CN55-63	NC	EP PCB CN1-63		Not Used
CN55-64	NC	EP PCB CN1-64		Not Used
CN55-65	NC	EP PCB CN1-65		Not Used
CN55-66	nMIRQPD	EP PCB CN1-66		Low Enable
CN55-67	IOD[2]	EP PCB CN1-67		Data Signal

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-68	IOD[3]	EP PCB CN1-68	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-69	IOD[6]	EP PCB CN1-69	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-70	IOD[7]	EP PCB CN1-70	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-71	IOD[10]	EP PCB CN1-71	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-72	IOD[11]	EP PCB CN1-72	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-73	IOD[14]	EP PCB CN1-73	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-74	IOD[15]	EP PCB CN1-74	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-75	NC	EP PCB CN1-75		Not Used
CN55-76	NC	EP PCB CN1-76		Not Used
CN55-77	NC	EP PCB CN1-77		Not Used
CN55-78	NC	EP PCB CN1-78		Not Used
CN55-79	GND	EP PCB CN1-79	<div> <div>0V</div>  </div>	Ground

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-80	NC	EP PCB CN1-80		Not Used
CN55-81	NC	EP PCB CN1-81		Not Used
CN55-82	NC	EP PCB CN1-82		Not Used
CN55-83	NC	EP PCB CN1-83		Not Used
CN55-84	GND	EP PCB CN1-84		Ground
CN55-85	GND	EP PCB CN1-85		Ground
CN55-86	GND	EP PCB CN1-86		Ground
CN55-87	nPDLRD	EP PCB CN1-87		Low Enable
CN55-88	nPDLRST	EP PCB CN1-88		Low Enable
CN55-89	PD[2]	EP PCB CN1-89		Data Signal
CN55-90	PD[3]	EP PCB CN1-90		Data Signal
CN55-91	PD[6]	EP PCB CN1-91		Data Signal


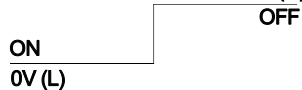


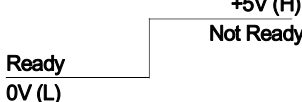
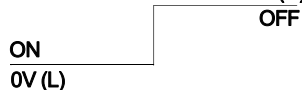
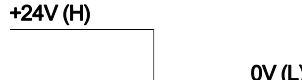
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN55-92	PD[7]	EP PCB CN1-92	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-93	GND	EP PCB CN1-93	<div> <div>0V</div>  </div>	Ground
CN55-94	GND	EP PCB CN1-94	<div> <div>0V</div>  </div>	Ground
CN55-95	PD[10]	EP PCB CN1-95	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-96	PD[11]	EP PCB CN1-96	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-97	PD[14]	EP PCB CN1-97	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-98	PD[15]	EP PCB CN1-98	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN55-99	+5V	EP PCB CN1-99	<div> <div>+5V</div>  </div>	+5 VDC Power Supply
CN55-100	+5V	EP PCB CN1-100	<div> <div>+5V</div>  </div>	+5 VDC Power Supply

3.9. LPC PCB

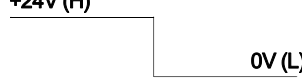








CN51

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN51-1	nLDCTL	LSU P101-1		Laser Power Sample/Hold Timing Signal 1 ms (16 dot) 0.652 ms (600 dpi)
CN51-2	nHSYNC	LSU P101-2		H-SYNC Video Signal 1 ms (16 dot) 0.652 ms (600 dpi)
CN51-3	L+5V	LSU P101-3		+5V Power Supply for Laser Drive Circuit


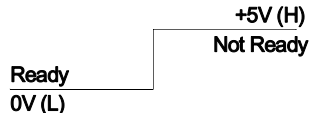

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN51-4	GND	LSU P101-4		Ground
CN51-5	nLDON	LSU P101-5		Laser Control Signal
CN51-6	nVIDEO	LSU P101-6		Video Data L=Black, H=White
CN51-7	GND	LSU P101-7		Ground
CN51-8	nPMCK	LSU CN1-1		Polygon Motor Clock 3.3 KHz (16 dot) 5.1 KHz (600 dpi)
CN51-9	nPMRY	LSU CN1-2		Polygon Motor Ready Signal
CN51-10	nPMON	LSU CN1-3		Polygon Motor Control Signal
CN51-11	MGND	LSU CN1-4		Frame Ground
CN51-12	+24VM	LSU CN1-5		+24 VDC Power Supply

CN52

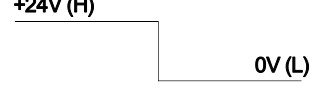

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN52-1	+24VM	HVPS CN39-1		+24 VDC Power Supply
CN52-2	nCR0	HVPS CN39-2		Charge Control AC Output

PIn No.	Signal Name	Destination	Signal Waveform	Function
CN52-3	nCR1	HVPS CN39-3		Charge Control DC Output
CN52-4	nDR0	HVPS CN39-4		Development Control AC+DC Output
CN52-5	nTR0	LSU P101-5		Transfer Control Cleaning Output
CN52-6	nTR1	LSU P101-6		Transfer Control Transfer Output
CN52-7	MGND	LSU P101-7		Ground

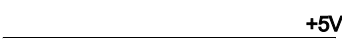

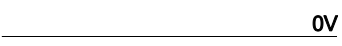
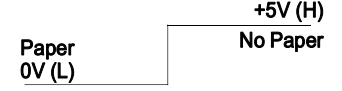
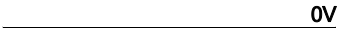
CN54

PIn No.	Signal Name	Destination	Signal Waveform	Function
CN54-1	+24VDR	Fan		Fan Control Signal
CN54-2	nFNRDT	Fan		Fan Ready Signal
CN54-3	MGND	Fan		Ground


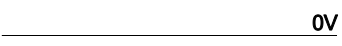
CN55

PIn No.	Signal Name	Destination	Signal Waveform	Function
CN55-1	+24VM	Paper Feed Solenoid		+24 VDC Power Supply
CN55-2	nADF1	Paper Feed Solenoid		Paper Feed Roller Solenoid Control Signal


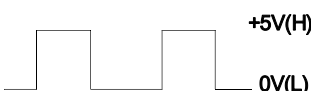

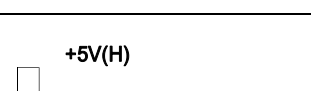
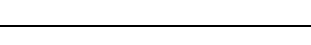


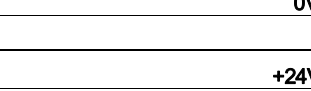


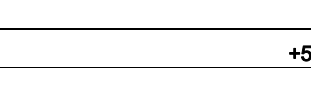
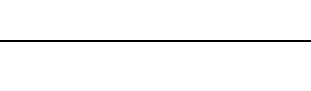
CN56

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN56-1	+5V	Thermistor CN115-1		+5 VDC Power Supply
CN56-2	THERM	Thermistor CN115-2	Analog Signal	Fuser Thermistor Voltage Level signal
CN56-3	nESEN	Paper Exit Sensor CN112-1		Paper Exit Sensor Detection Signal
CN56-4	GND	Paper Exit Sensor CN112-2		Ground
CN56-5	LDSE	Paper Exit Sensor CN112-3	Approx. +2 VDC	Paper Exit Sensor LED Drive Current
CN56-6	nPCHK1	No Paper Sensor CN111-1		No Paper Detection Signal
CN56-7	GND	No Paper Sensor CN111-2		Ground
CN56-8	LDSP1	No Paper Sensor CN111-3	Approx. +2 VDC	No Paper Sensor LED Drive Current

CN57

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN57-1	nCCHK1	Cassette Detect Sensor		No Cassette Detection Signal
CN57-2	NC			Not Connected
CN57-3	GND	Cassette Detect Sensor		Ground

CN58

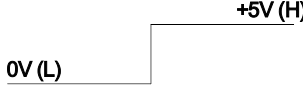
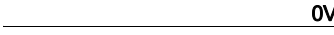
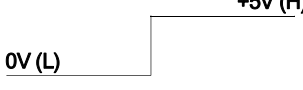
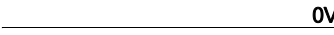
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN58-1	nSDO	CTS2 CN81-1		500 Sheets Cassette Interface TX DATA
CN58-2	nSDI	CTS2 CN81-2		500 Sheets Cassette Interface RX DATA
CN58-3	nSCK	CTS2 CN81-3		500 Sheets Cassette Interface CLOCK
CN58-4	pOPRST	CTS2 CN81-4		500 Sheets Cassette Interface Reset
CN58-5	MGND	CTS2 CN81-5		Ground
CN58-6	MGND	CTS2 CN81-6		Ground
CN58-7	+24	CTS2 CN81-7		+24 VDC Power Supply
CN58-8	+24VM	CTS2 CN81-8		+24 VDC Power Supply
CN58-9	+5V	CTS2 CN81-9		+5 VDC Power Supply
CN58-10	GND	CTS2 CN81-10		Ground
CN58-11	nOP	CTS2 CN81-11		250 Sheets Feeder Unit Detection Signal
CN58-12	pADF2	CTS2 CN81-12		Feed Roller Drive Clutch Control Signal (250 sheets Cassette)

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN58-13	nPDOR2	CTS2 CN81-13		Jam Cover Sensor Detection Signal
CN58-14	nPCHK2	CTS2 CN81-14		No Paper Detection Signal (250 sheets Cassette)
CN58-15	nSIZE23	CTS2 CN81-15		Not Used
CN58-16	nCCHK2	CTS2 CN81-16		No Paper Detection Signal (250 sheets Cassette)
CN58-17	nSIZE22	CTS2 CN81-17		Same as CN61
CN58-18	nSIZE21	CTS2 CN81-18		Same as CN61

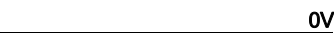
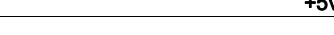
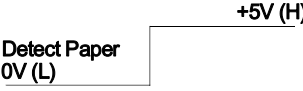

CN59

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN59-1	nMMP3	Printer Motor		Rotate Signal
CN59-2	nMMP2	Printer Motor		Motor Ready Signal
CN59-3	+24VM	Printer Motor		+24 VDC Power Supply
CN59-4	MGND	Printer Motor		Ground

CN61


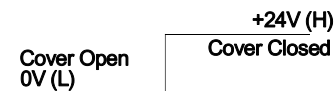
Pin No.	Signal Name	Destination	Signal Waveform	Function										
CN61-1	nSIZE11	SSN CN101-1		<table border="1"><tr><td>nSIZE11</td><td>L</td><td>H</td><td>L</td><td>H</td></tr><tr><td>nSIZE12</td><td>L</td><td>L</td><td>H</td><td>H</td></tr></table> <div style="text-align: center;"><div style="display: flex; justify-content: space-around; width: 100%;"><div style="text-align: center;">LTR ↑</div><div style="text-align: center;">LGL ↑</div><div style="text-align: center;">A4 ↑</div></div></div>	nSIZE11	L	H	L	H	nSIZE12	L	L	H	H
nSIZE11	L	H	L	H										
nSIZE12	L	L	H	H										
CN61-2	GND	SSN 101-2												
CN61-3	NC													
CN61-4	nSIZE12	SSN 101-4												
CN61-5	GND	SSN 101-5												
CN61-6	NC													

CN62

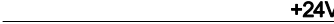





Pin No.	Signal Name	Destination	Signal Waveform	Function
CN62-1	GND	Toner Sensor CN114-1		Ground
CN62-2	TONER	Toner Sensor CN114-2	Analog Signal	Remaining Toner Level Signal
CN62-3	+5V	Toner Sensor CN114-3		+5 VDC Power Supply
CN62-4	nRSEN	Timing Sensor CN113-1		Timing Sensor Detection Signal
CN62-5	GND	Timing Sensor CN113-2		Ground

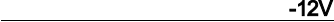
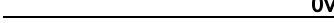
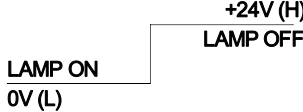
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN62-6	LDSR	Toner Sensor CN113-3	Approx. +2 VDC	Timing Sensor LED Drive Current

CN63

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN63-1	+24V	ILS PCB CN73-1	 +24V	+24 VDC Power Supply
CN63-2	NC			Not Connected
CN63-3	+24VD	ILS PCB CN73-3		Printer Cover Detection Signal

CN67

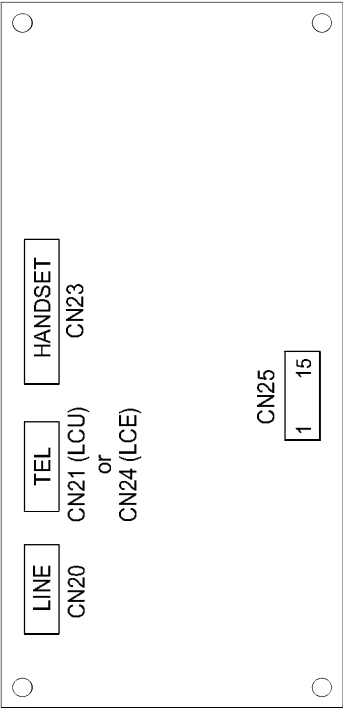
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN67-1	+24V	POW PCB CN33-1	 +24V	+24 VDC Power Supply
CN67-2	+24V	POW PCB CN33-2	 +24V	+24 VDC Power Supply
CN67-3	MGND	POW PCB CN33-3	 0V	Ground
CN67-4	MGND	POW PCB CN33-4	 0V	Ground
CN67-5	+5V	POW PCB CN33-5	 +5V	+5 VDC Power Supply
CN67-6	GND	POW PCB CN33-6	 0V	Ground

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN67-7	-12V	POW PCB CN33-7	 -12V	-12V VDC Power Supply
CN67-8	AGND	POW PCB CN33-8	 0V	Ground
CN67-9	SSR	POW PCB CN33-9	 +24V (H) LAMP OFF LAMP ON 0V (L)	Fuser Lamp Control Signal

CN69

Refer to FCB PCB CN12.

3.10. LCU / LCE PCB



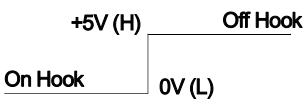

CN20

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN20-1	NC			Not Used
CN20-2	NC			Not Used
CN20-3	L2(T)	Telephone Line		Line Signal
CN20-4	L1(R)	Telephone Line		Line Signal

CN21

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN21-1	NC			Not Used
CN21-2	NC			Not Used
CN21-3	T1	External Telephone		Line Signal for the External Telephone
CN21-4	T2	External Telephone		Line Signal for the External Telephone

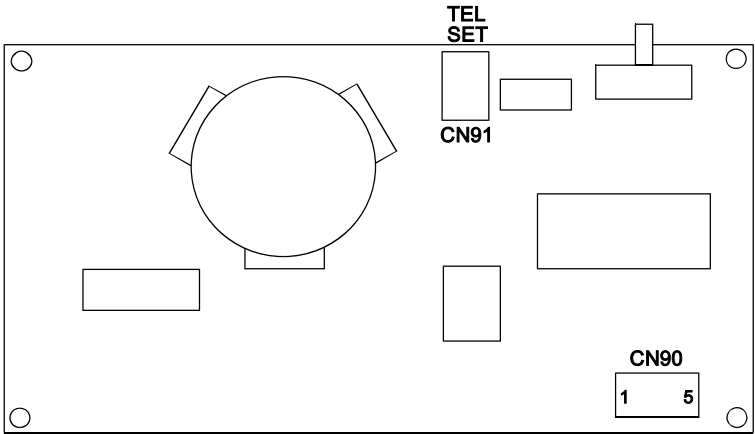
CN23

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN23-1	NC			Not Connected
CN23-2	HLIN1	SRU PCB CN90-1		Line Signal for the Fax Handset
CN23-3	HLIN2	SRU PCB CN90-2		Line Signal for the Fax Handset
CN23-4	NC	SRU PCB CN90-3		Not Connected
CN23-5	AI	SRU PCB CN90-4		Switch Hook Signal
CN23-6	AIS	SRU PCB CN90-5		Ground

CN25

Refer to FCB PCB CN3.

3.11. SRU PCB (Optional)

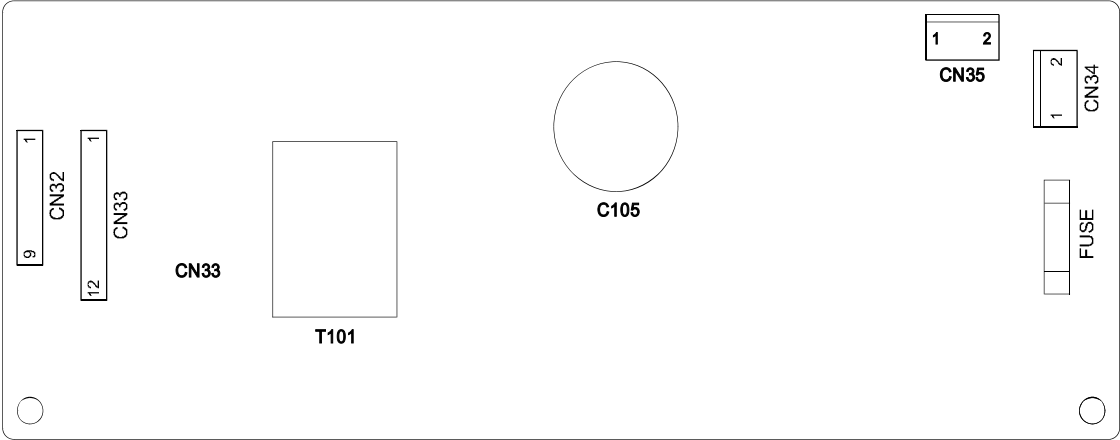


CN90
Refer to LCU PCB CN23.

CN91

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN91-1	NC			Not Connected
CN91-2	MIC (+)	Telephone Handset CN		Handset Microphone
CN91-3	RCV (+)	Telephone Handset CN		Handset Receiver
CN91-4	RCV (-)	Telephone Handset CN		Handset Receiver
CN91-5	MIC (-)	Telephone Handset CN		Handset Microphone
CN91-6	TGND		<div>0V</div>	Ground

3.12. Low Voltage Power Supply PCB (POW)



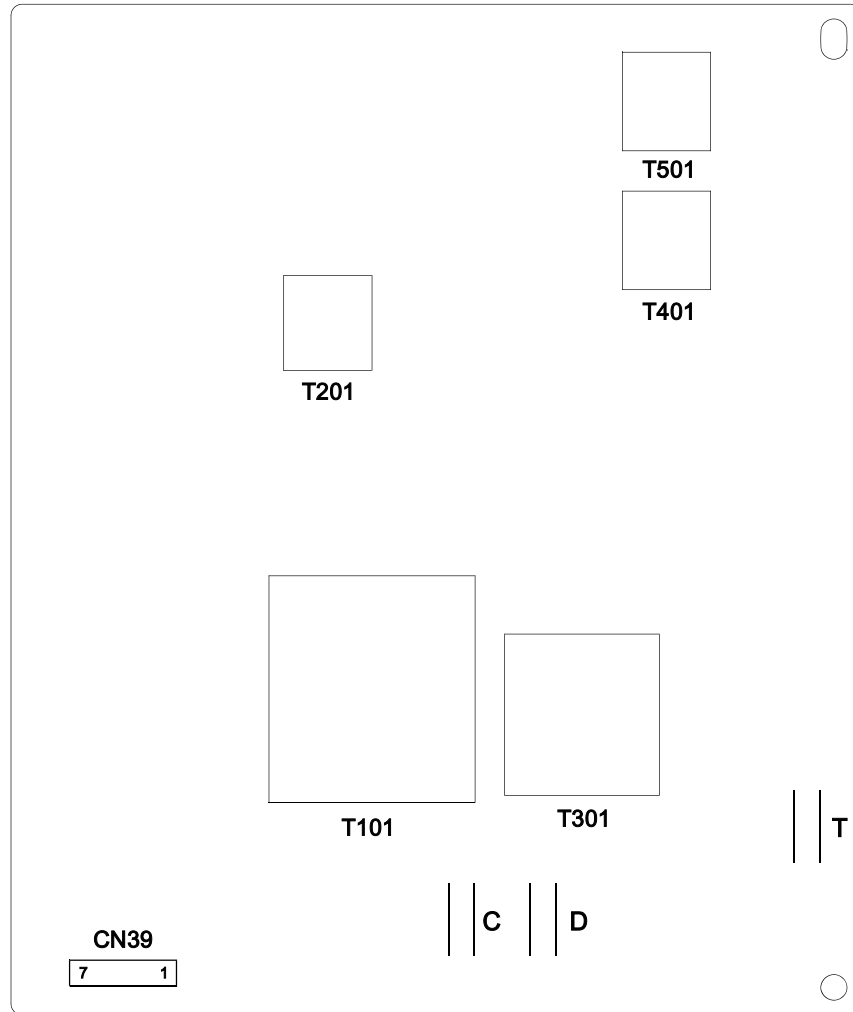
CN32
Refer to FCB PCB CN13.
CN33
Refer to LPC PCB CN1.
CN34

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN34-1	LIVE	ACI PCB		AC Input (Black-Live)
CN34-2	NEUTRAL	ACI PCB		AC Input (White-Neutral)

CN35

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN35-1	HEAT 2	Fuser Unit CN116		Fuser Lamp AC (White-Neutral)
CN35-2	HEAT 1	Fuser Unit CN116		Fuser Lamp AC (Black-Live)

3.13. High Voltage Power Supply PCB (HVPS)



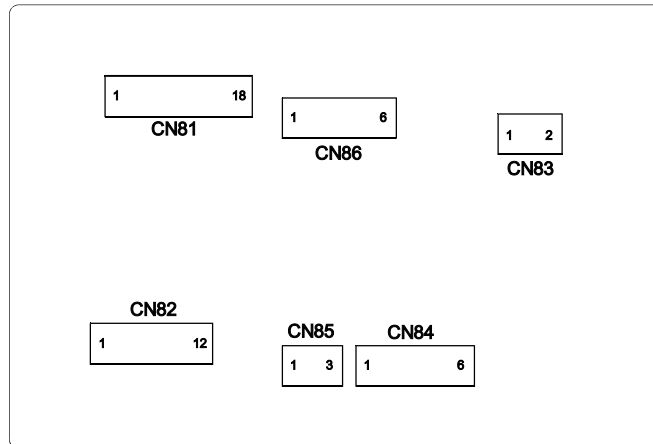
High Voltage Output

Pin No.	Signal Name	Destination	Signal Waveform	Function
T	Transfer	Bias Transfer Roller		(1) Transfer Current: (+3 μ A) (2) Cleaning Voltage: (-800 V)
C	Charge	Bias Charge Roller		Charge Current: 450 μ A (AC 400 Hz Sine Wave) & DC Charge Voltage
D	Development	Development Roller		Development Voltage (AC 1.7 kHz Square Wave) & DC Voltage

CN39

Refer to LPC PCB CN52.

3.14. CST2 PCB (Option)


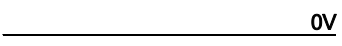


CN81

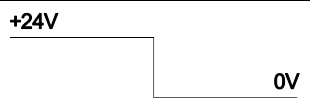
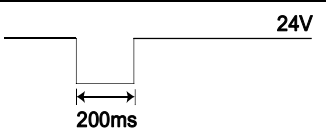
Refer to LPC PCB CN58.

CN82

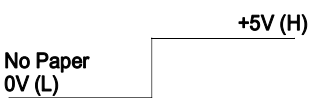
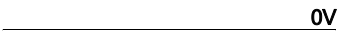

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN82-1	nSDO	CST3PCB CN101-1		500 Sheet Cassette Interface TX Data
CN82-2	nSDI	CST3PCB CN101-2		500 Sheet Cassette Interface RX Data
CN82-3	nSCK	CST3PCB CN101-3		500 Sheet Cassette Interface clock
CN82-4	pOPRST	CST3PCB CN101-4		500 Sheet Cassette Reset Signal
CN82-5	MGND	CST3PCB CN101-5		Ground
CN82-6	MGND	CST3PCB CN101-6		Ground
CN82-7	+24V	CST3PCB CN101-7		+24 VDC Power Supply
CN82-8	+24VM	CST3PCB CN101-8		+24 VDC Power Supply


Pin No.	Signal Name	Destination	Signal Waveform	Function
CN82-9	+5V	CST3PCB CN101-9		+5 VDC Power Supply
CN82-10	GND	CST3PCB CN101-10		Ground
CN82-11				Not Connected
CN82-12				Not Connected

CN83



Pin No.	Signal Name	Destination	Signal Waveform	Function
CN83-1	+24VM	Paper Feed Solenoid		+24 VDC Power Supply
CN83-2	nADF2	Paper Feed Solenoid		Feed Roller Drive Clutch Control Signal (250 Sheet Cassette)

CN84

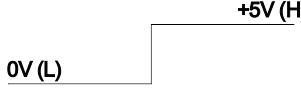
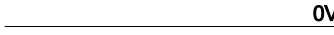
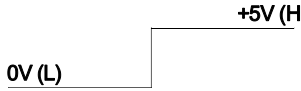
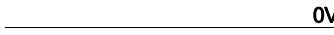
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN84-1	nPCHK2	No Paper Sensor CN121-1		No Paper Detection Signal
CN84-2	GND	No Paper Sensor CN121-2		Ground
CN84-3	LDSP2	No Paper Sensor CN121-3	Approx. +2 VDC	+2 VDC Power Supply
CN84-4	nPDOR2	Jam Access Cover Detect Sensor CN122-1		Jam Cover Open Detection

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN84-5	GND	Jam Access Cover Detect Sensor CN122-2	 0V	Ground
CN84-6	LDSD2	Jam Access Cover Detect Sensor CN122-3	Approx. +2 VDC	+2 VDC Power Supply

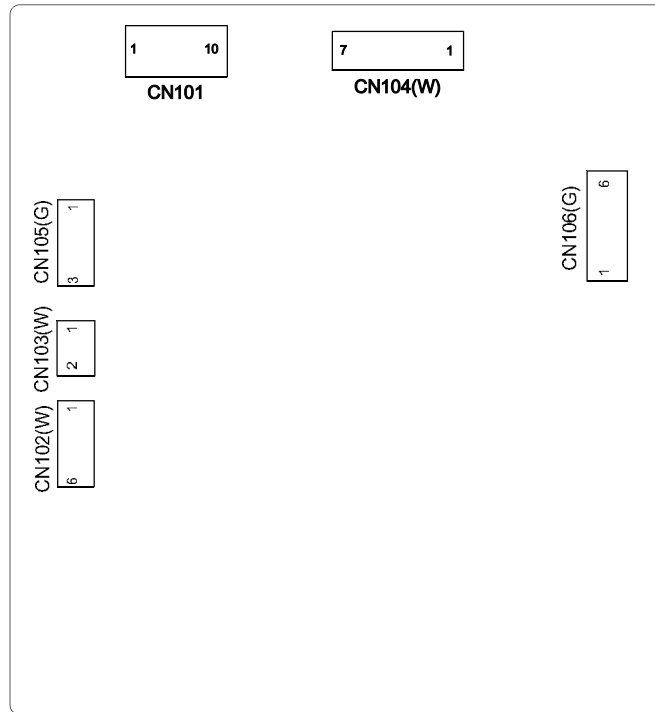
CN85

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN85-1	nCHK2	Cassette Detect Sensor	 +5V (H) No Cassette 0V (L)	Paper Cassette Detection
CN85-2	NC			Not Connected
CN85-3	GND	Cassette Detect Sensor	 0V	Ground

CN86

Pin No.	Signal Name	Destination	Signal Waveform	Function										
CN86-1	nSIZE21	SSN PCB CN101-1		<table border="1"><tr><td>nSIZE21</td><td>L</td><td>H</td><td>L</td><td>H</td></tr><tr><td>nSIZE22</td><td>L</td><td>L</td><td>H</td><td>H</td></tr></table> <div style="text-align: center;"><div style="display: flex; justify-content: space-around; width: 100%;"><div style="text-align: center;">LTR ↑</div><div style="text-align: center;">LGL ↑</div><div style="text-align: center;">A4 ↑</div></div></div>	nSIZE21	L	H	L	H	nSIZE22	L	L	H	H
nSIZE21	L	H	L		H									
nSIZE22	L	L	H		H									
CN86-2	GND	SSN PCB CN101-2												
CN86-3	NC													
CN86-4	nSIZE22	SSN PCB CN101-4												
CN86-5	GND	SSN PCB CN101-5												
CN86-6	NC													

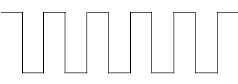
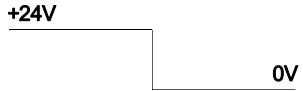
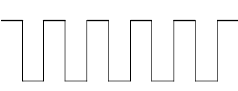
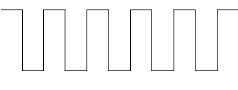
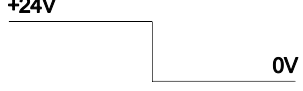
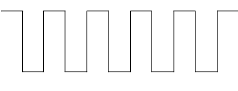
3.15. CST3 PCB (Option)



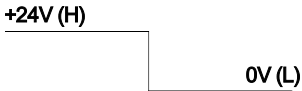
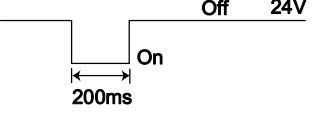
CN101

Refer to CST2 PCB CN82.

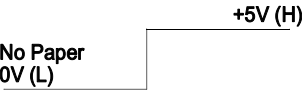



CN102

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN102-1	n3MP1	Main Motor	 +24V 0V	Motor Drive Signal 1
CN102-2	+24VM	Main Motor	 +24V 0V	+24 VDC Power Supply
CN102-3	n3MP0	Main Motor	 +24V 0V	Motor Drive Signal 0
CN102-4	n3MP3	Main Motor	 +24V 0V	Motor Drive Signal 3
CN102-5	+24VM	Main Motor	 +24V 0V	+24 VDC Power Supply
CN102-6	n3MP2	Main Motor	 +24V 0V	Motor Drive Signal 2

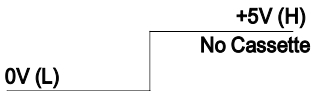

CN103

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN103-1	+24VM	Paper Feed Solenoid		+24 VDC Power Supply
CN103-2	nADF3	Paper Feed Solenoid		Paper Feed Solenoid Control Signal

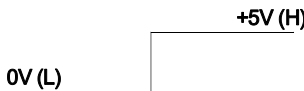

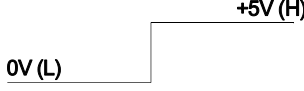

CN104

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN104-1	nPCHK2	No Paper Sensor CN131-1		No Paper Detection Signal
CN104-2	GND	No Paper Sensor CN131-2		Ground
CN104-3	LDSP3	No Paper Sensor CN131-3	Approx. +2 VDC	+2 VDC Power Supply
CN104-4	nPDOR3	Jam Access Cover Detect Sensor CN132-1		Jam Cover Open Detection
CN104-5	GND	Jam Access Cover Detect Sensor CN132-2		Ground
CN104-6	LDSD3	Jam Access Cover Detect Sensor CN132-3	Approx. +2 VDC	+2 VDC Power Supply
CN104-7	NC			Not Connected

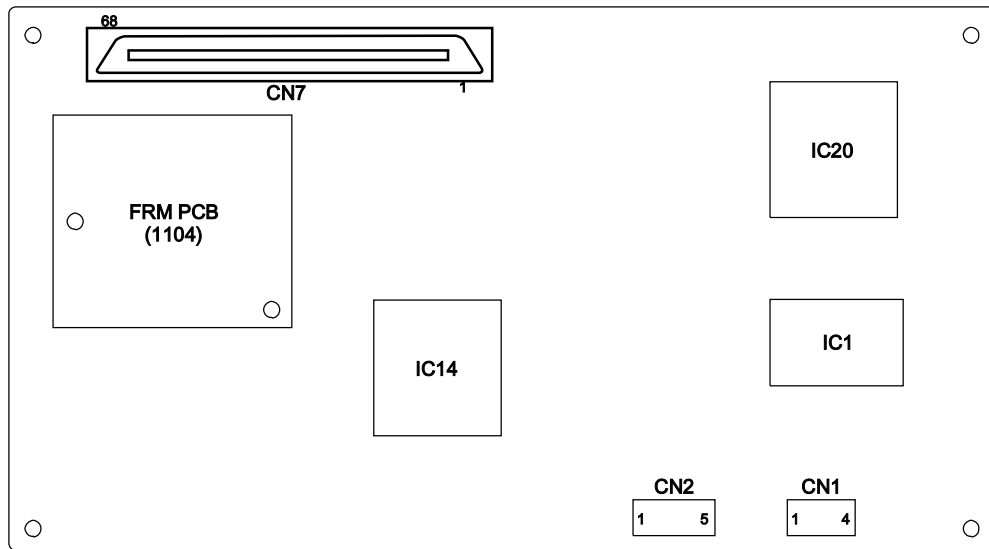
CN105

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN105-1	nCHK3	Cassette Detect Sensor		Paper Cassette Detection
CN105-2	NC	Cassette Detect Sensor		Not Connected
CN105-3	GND	Cassette Detect Sensor		Ground

CN106

Pin No.	Signal Name	Destination	Signal Waveform	Function										
CN106-1	nSIZE31	SSN PCB CN101-1		<table border="1"><tr><td>nSIZE31</td><td>L</td><td>H</td><td>L</td><td>H</td></tr><tr><td>nSIZE32</td><td>L</td><td>L</td><td>H</td><td>H</td></tr></table> <div style="text-align: center;"><div style="display: flex; justify-content: space-around; width: 100%;"><div style="text-align: center;">↑ LTR</div><div style="text-align: center;">↑ LGL</div><div style="text-align: center;">↑ A4</div></div></div>	nSIZE31	L	H	L	H	nSIZE32	L	L	H	H
nSIZE31	L	H	L	H										
nSIZE32	L	L	H	H										
CN106-2	GND	SSN PCB CN101-2												
CN106-3	NC													
CN106-4	nSIZE32	SSN PCB CN101-4												
CN106-5	GND	SSN PCB CN101-5												
CN106-6	NC													

3.16. LANB PCB



Note: The FRM PC Board contains the firmware for the LANB PC Board.
CN1

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-1	TD+	LANC PCB CN200-8		Transmission Data+
CN1-2	TD-	LANC PCB CN200-7		Transmission Data-
CN1-3	RD+	LANC PCB CN200-6		Reception Data+
CN1-4	RD-	LANC PCB CN200-5		Reception Data-

CN2



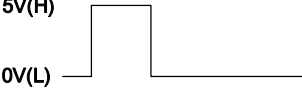
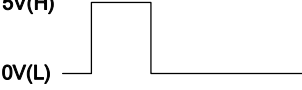
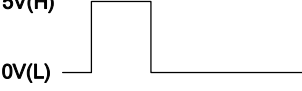

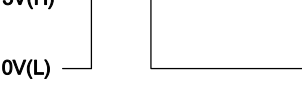

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN2-1	nLNKLED	LANC PCB CN200-1		LINK Status Detection
CN2-2	nRXLED	LANC PCB CN200-3		Receive Data Detection

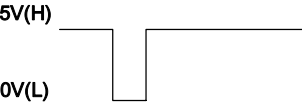

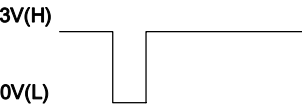
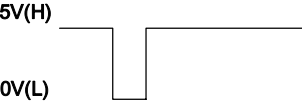
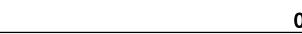
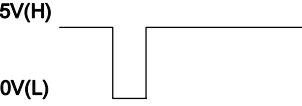
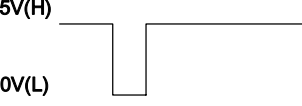
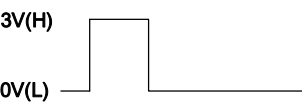
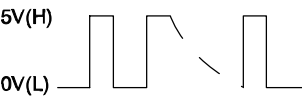
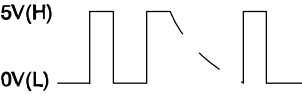
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN2-3	+5V	LANC PCB CN200-2		+5V VDC Power Supply
CN2-4	NC			
CN2-5	NC			

RD+/- : Differential receive Signals for twisted pair cable.





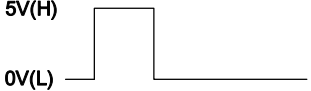
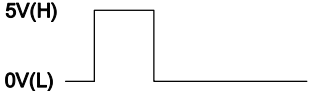
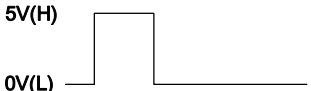
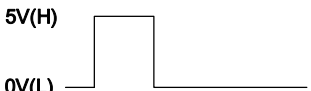

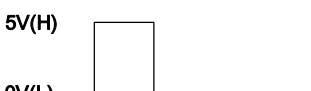


TD+/- : Differential send Signals for twisted pair cable.

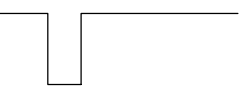
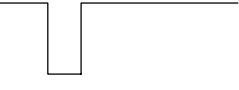


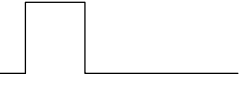
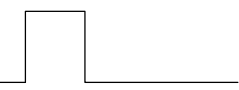
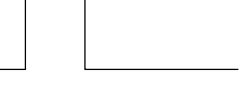
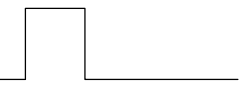

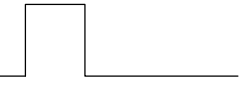
CN7

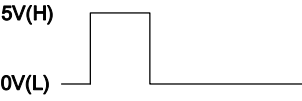
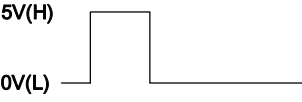
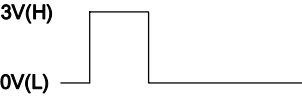
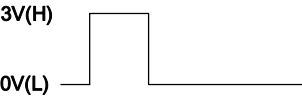
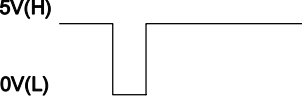
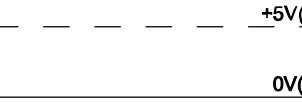



Pin No.	Signal Name	Destination	Signal Waveform	Function
CN7-1	+5V	FCB PCB CN50-1		+5 VDC Power Supply
CN7-2	+5V	FCB PCB CN50-2		+5 VDC Power Supply
CN7-3	OPA[1]	FCB PCB CN50-3		Address Signal
CN7-4	OPA[2]	FCB PCB CN50-4		Address Signal
CN7-5	OPA[5]	FCB PCB CN50-5		Address Signal
CN7-6	OPA[6]	FCB PCB CN50-6		Address Signal
CN7-7	OPA[9]	FCB PCB CN50-7		Address Signal
CN7-8	OPA[10]	FCB PCB CN50-8		Address Signal

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN7-9	nWAIT[5]	FCB PCB CN50-9		Low Enable
CN7-10	NC	FCB PCB CN50-10		Not Used
CN7-11	nCSOB	FCB PCB CN50-11		Low Enable
CN7-12	nCSOE	FCB PCB CN50-12		Low Enable
CN7-13	nOPWRH	FCB PCB CN50-13		Low Enable
CN7-14	GND	FCB PCB CN50-14		Ground
CN7-15	nIRQOP1	FCB PCB CN50-15		Low Enable
CN7-16	nIRQOP2	FCB PCB CN50-16		Low Enable
CN7-17	NC	FCB PCB CN50-17		Not Used
CN7-18	pOP1RST	FCB PCB CN50-18		High Enable
CN7-19	IOD[0]	FCB PCB CN50-19		Data Signal
CN7-20	IOD[1]	FCB PCB CN50-20		Data Signal

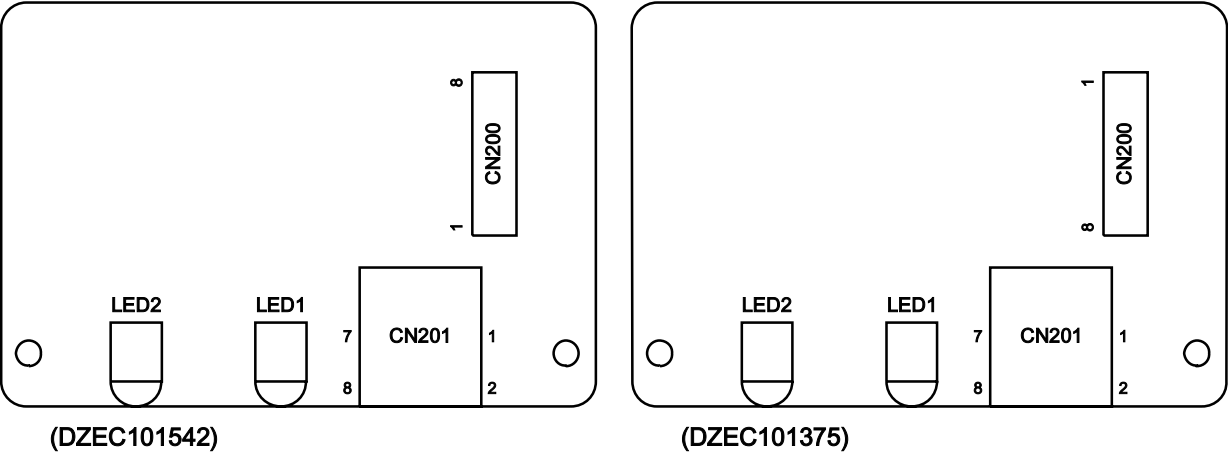
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN7-21	IOD[4]	FCB PCB CN50-21		Data Signal
CN7-22	IOD[5]	FCB PCB CN50-22		Data Signal
CN7-23	IOD[8]	FCB PCB CN50-23		Data Signal
CN7-24	IOD[9]	FCB PCB CN50-24		Data Signal
CN7-25	IOD[12]	FCB PCB CN50-25		Data Signal
CN7-26	IOD[13]	FCB PCB CN50-26		Data Signal
CN7-27	nWAIT[3]	FCB PCB CN50-27		Low Enable
CN7-28	nWAIT[4]	FCB PCB CN50-28		Low Enable
CN7-29	nOPB1	FCB PCB CN50-29		Low Enable
CN7-30	nOPB2	FCB PCB CN50-30		Low Enable
CN7-31	NC	FCB PCB CN50-31		Not Used
CN7-32	NC	FCB PCB CN50-32		Not Used

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN7-33	+5VP	FCB PCB CN50-33		+5 VDC Power Supply
CN7-34	+24V	FCB PCB CN50-34		+24 VDC Power Supply
CN7-35	GND	FCB PCB CN50-35		Ground
CN7-36	GND	FCB PCB CN50-36		Ground
CN7-37	OPA[3]	FCB PCB CN50-37		Address Signal
CN7-38	OPA[4]	FCB PCB CN50-38		Address Signal
CN7-39	OPA[7]	FCB PCB CN50-39		Address Signal
CN7-40	OPA[8]	FCB PCB CN50-40		Address Signal
CN7-41	OPA[11]	FCB PCB CN50-41		Address Signal
CN7-42	OPA[12]	FCB PCB CN50-42		Address Signal
CN7-43	nCS09	FCB PCB CN50-43		Low Enable
CN7-44	nCS0A	FCB PCB CN50-44		Low Enable

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN7-45	nOPRD	FCB PCB CN50-45	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Low Enable
CN7-46	nOPWRL	FCB PCB CN50-46	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Low Enable
CN7-47	nWAIT[1]	FCB PCB CN50-47	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Low Enable
CN7-48	NC	FCB PCB CN50-48		Not Used
CN7-49	NC	FCB PCB CN50-49		Not Used
CN7-50	nMIRQPDL	FCB PCB CN50-50	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Low Enable
CN7-51	IOD[2]	FCB PCB CN50-51	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN7-52	IOD[3]	FCB PCB CN50-52	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN7-53	IOD[6]	FCB PCB CN50-53	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN7-54	IOD[7]	FCB PCB CN50-54	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN7-55	IOD[10]	FCB PCB CN50-55	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal
CN7-56	IOD[11]	FCB PCB CN50-56	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Address Signal

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN7-57	IOD[14]	FCB PCB CN50-57		Address Signal
CN7-58	IOD[15]	FCB PCB CN50-58		Address Signal
CN7-59	pOP2RST	FCB PCB CN50-59		High Enable
CN7-60	pOP3RST	FCB PCB CN50-60		High Enable
CN7-61	nOPB3	FCB PCB CN50-61		Low Enable
CN7-62	NC	FCB PCB CN50-62		Not Used
CN7-63	nPSDES	FCB PCB CN50-63		H: Option Not Installed L : Option Installed
CN7-64	NC	FCB PCB CN50-64		Not Used
CN7-65	NC	FCB PCB CN50-65		Not Used
CN7-66	+3.3V	FCB PCB CN50-66		+3.3 VDC Power Supply
CN7-67	-12V	FCB PCB CN50-67		-12 VDC Power Supply
CN7-68	GND	FCB PCB CN50-68		Ground

3.17. LANC PCB



CN200

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN200-1	nLNKLED	LANB PCB CN2-1		LED LINK Status Detection
CN200-2	+5V	LANB PCB CN2-3		+5V VDC Power Supply
CN200-3	nRXLED	LANB PCB CN2-2		LED Receive Data Detection
CN200-4	NC			
CN200-5	RD-	LANB PCB CN1-4		Reception Data-
CN200-6	RD+	LANB PCB CN1-3		Reception Data+
CN200-7	TD-	LANB PCB CN1-2		Transmission Data-
CN200-8	TD+	LANB PCB CN1-1		Transmission Data+

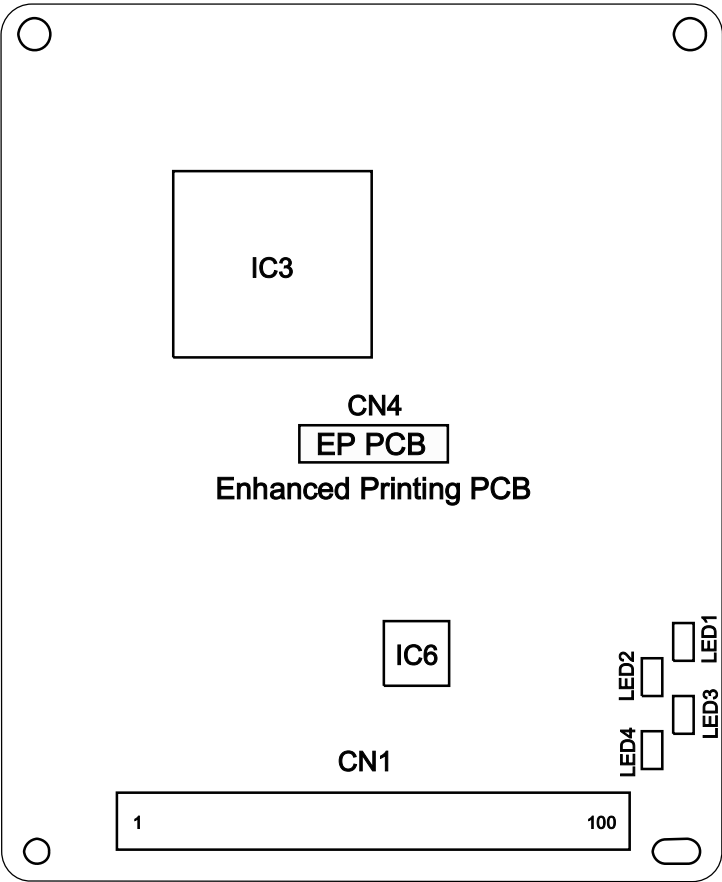
CN201

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN201-1	TD+	LAN		Transmission Data+
CN201-2	TD-	LAN		Transmission Data-
CN201-3	RD+	LAN		Reception Data+
CN201-4	NC			
CN201-5	NC			
CN201-6	RD-	LAN		Reception Data-
CN201-7	NC			
CN201-8	NC			

RD+/- : Differential receive Signals for twisted pair cable.

TD+/- : Differential send Signals for twisted pair cable.



3.18. Page Description Language Printer Interface PCB

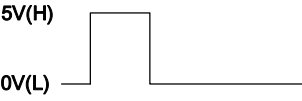
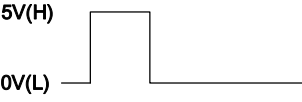
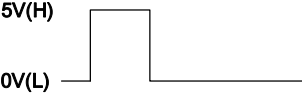
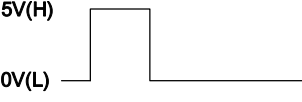
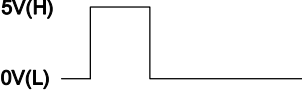
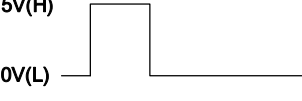
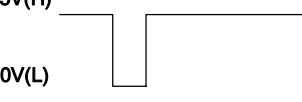
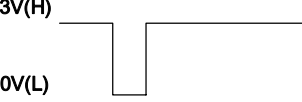
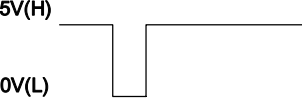



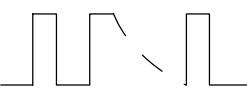
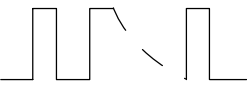
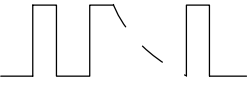
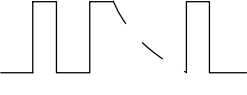

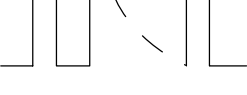
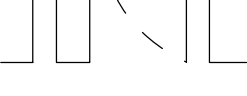
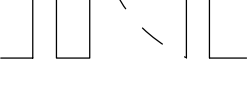
	LED 1	LED 2	LED 3	LED 4
Status 1	Off	On	Off	On
Status 2	Off	Off	On	On
Status 3	On	Off	On	On
Status 4	On	On	Off	On
Status 5	On	Off	Off	Off


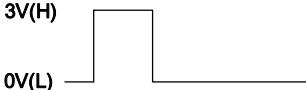

- Status 1 : Receiving Printer data from the Ethernet
- Status 2 & 3 : Converting the PCL data into rasterized image data
- Status 4 : Printing the rasterized image data
- Status 5 : Standby Mode

CN1


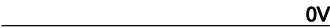
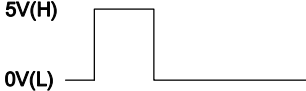
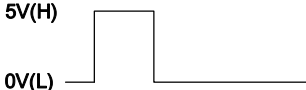
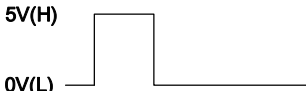
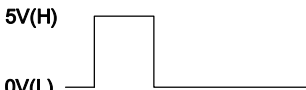

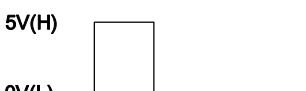


Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-1	+5V	FCB PCB CN55-1		+5 VDC Power Supply
CN1-2	+5V	FCB PCB CN55-2		+5 VDC Power Supply


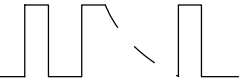
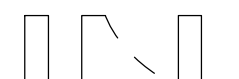

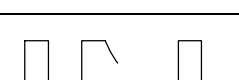
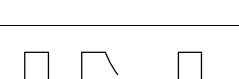
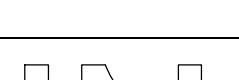
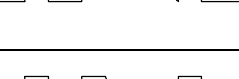
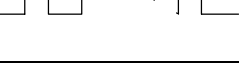
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-3	A[1]	FCB PCB CN55-3		Address Signal
CN1-4	A[2]	FCB PCB CN55-4		Address Signal
CN1-5	A[5]	FCB PCB CN55-5		Address Signal
CN1-6	A[6]	FCB PCB CN55-6		Address Signal
CN1-7	A[9]	FCB PCB CN55-7		Address Signal
CN1-8	A[10]	FCB PCB CN55-8		Address Signal
CN1-9	nWAIT[5]	FCB PCB CN55-9		Low Enable
CN1-10	N.C.	FCB PCB CN55-10		Not used
CN1-11	N.C.	FCB PCB CN55-11		Not used
CN1-12	nCS0E	FCB PCB CN55-12		Low Enable
CN1-13	nIOWRH	FCB PCB CN55-13		Low Enable
CN1-14	GND	FCB PCB CN55-14		Ground

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-15	N.C.	FCB PCB CN55-15		Not used
CN1-16	N.C.	FCB PCB CN55-16		Not used
CN1-17	N.C.	FCB PCB CN55-17		Not used
CN1-18	N.C.	FCB PCB CN55-18		Not used
CN1-19	IOD[0]	FCB PCB CN55-19	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-20	IOD[1]	FCB PCB CN55-20	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-21	IOD[4]	FCB PCB CN55-21	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-22	IOD[5]	FCB PCB CN55-22	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-23	IOD[8]	FCB PCB CN55-23	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-24	IOD[9]	FCB PCB CN55-24	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-25	IOD[12]	FCB PCB CN55-25	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-26	IOD[13]	FCB PCB CN55-26	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal

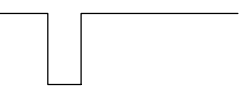
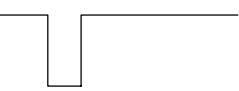
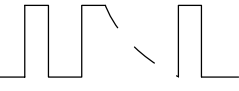
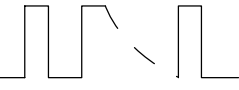
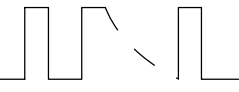
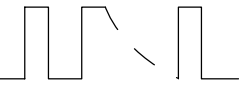


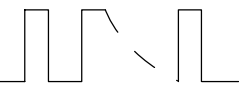
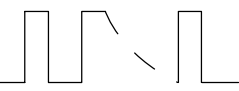
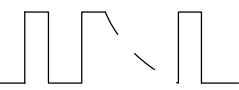
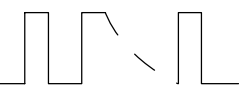
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-27	N.C.	FCB PCB CN55-27		Not used
CN1-28	N.C.	FCB PCB CN55-28		Not used
CN1-29	N.C.	FCB PCB CN55-29		Not used
CN1-30	N.C.	FCB PCB CN55-30		Not used
CN1-31	N.C.	FCB PCB CN55-31		Not used
CN1-32	N.C.	FCB PCB CN55-32		Not used
CN1-33	N.C.	FCB PCB CN55-33		Not used
CN1-34	N.C.	FCB PCB CN55-34		Not used
CN1-35	N.C.	FCB PCB CN55-35		Not used
CN1-36	GND	FCB PCB CN55-36		Ground
CN1-37	pPDLRQ	FCB PCB CN55-37		High Enable
CN1-38	nPDLAK	FCB PCB CN55-38		Low Enable



Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-39	PD[0]	FCB PCB CN55-39	<div> <div>5V(H)</div> <div>0V(L)</div> </div>	Data Signal
CN1-40	PD[1]	FCB PCB CN55-40	<div> <div>5V(H)</div> <div>0V(L)</div> </div>	Data Signal
CN1-41	PD[4]	FCB PCB CN55-41	<div> <div>5V(H)</div> <div>0V(L)</div> </div>	Data Signal
CN1-42	PD[5]	FCB PCB CN55-42	<div> <div>5V(H)</div> <div>0V(L)</div> </div>	Data Signal
CN1-43	GND	FCB PCB CN55-43	<div> <div>0V</div> </div>	Ground
CN1-44	GND	FCB PCB CN55-44	<div> <div>0V</div> </div>	Ground
CN1-45	PD[8]	FCB PCB CN55-45	<div> <div>5V(H)</div> <div>0V(L)</div> </div>	Data Signal
CN1-46	PD[9]	FCB PCB CN55-46	<div> <div>5V(H)</div> <div>0V(L)</div> </div>	Data Signal
CN1-47	PD[12]	FCB PCB CN55-47	<div> <div>5V(H)</div> <div>0V(L)</div> </div>	Data Signal
CN1-48	PD[13]	FCB PCB CN55-48	<div> <div>5V(H)</div> <div>0V(L)</div> </div>	Data Signal
CN1-49	GND	FCB PCB CN55-49	<div> <div>0V</div> </div>	Ground
CN1-50	GND	FCB PCB CN55-50	<div> <div>0V</div> </div>	Ground

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-51	GND	FCB PCB CN55-51		Ground
CN1-52	GND	FCB PCB CN55-52		Ground
CN1-53	A[3]	FCB PCB CN55-53		Address Signal
CN1-54	A[4]	FCB PCB CN55-54		Address Signal
CN1-55	A[7]	FCB PCB CN55-55		Address Signal
CN1-56	A[8]	FCB PCB CN55-56		Address Signal
CN1-57	A[11]	FCB PCB CN55-57		Address Signal
CN1-58	A[12]	FCB PCB CN55-58		Address Signal
CN1-59	N.C.	FCB PCB CN55-59		Not used
CN1-60	N.C.	FCB PCB CN55-60		Not used
CN1-61	nIORD	FCB PCB CN55-61		Low Enable
CN1-62	nIOWRL	FCB PCB CN55-62		Low Enable

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-63	N.C.	FCB PCB CN55-63		Not used
CN1-64	N.C.	FCB PCB CN55-64		Not used
CN1-65	N.C.	FCB PCB CN55-65		Not used
CN1-66	nMIRQPD	FCB PCB CN55-66	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Low Enable
CN1-67	IOD[2]	FCB PCB CN55-67	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-68	IOD[3]	FCB PCB CN55-68	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-69	IOD[6]	FCB PCB CN55-69	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-70	IOD[7]	FCB PCB CN55-70	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-71	IOD[10]	FCB PCB CN55-71	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-72	IOD[11]	FCB PCB CN55-72	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-73	IOD[14]	FCB PCB CN55-73	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-74	IOD[15]	FCB PCB CN55-74	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal

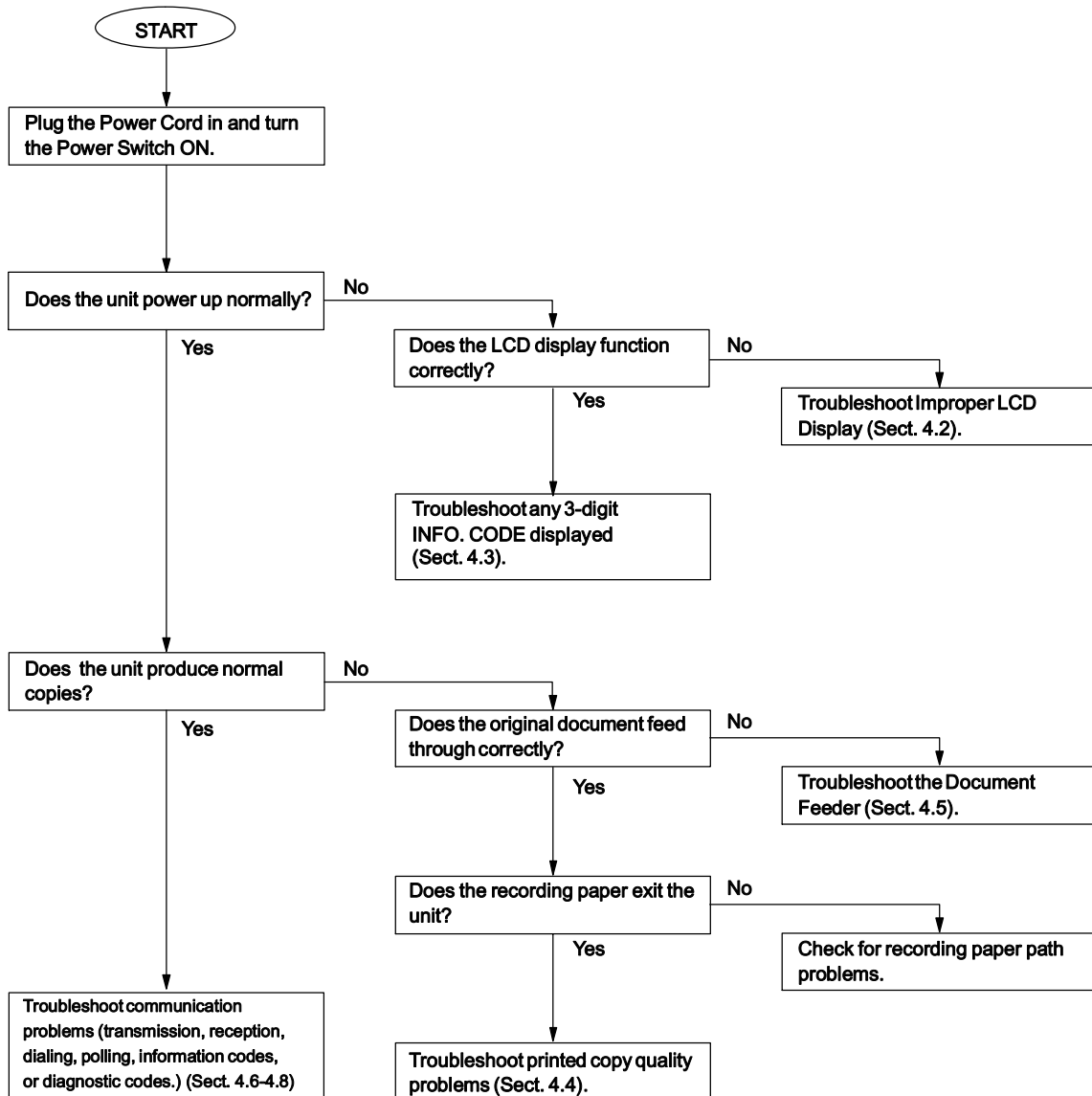
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-75	N.C.	FCB PCB CN55-75		Not used
CN1-76	N.C.	FCB PCB CN55-76		Not used
CN1-77	N.C.	FCB PCB CN55-77		Not used
CN1-78	N.C.	FCB PCB CN55-78		Not used
CN1-79	GND	FCB PCB CN55-79	_____0V	Ground
CN1-80	N.C.	FCB PCB CN55-80		Not used
CN1-81	N.C.	FCB PCB CN55-81		Not used
CN1-82	N.C.	FCB PCB CN55-82		Not used
CN1-83	N.C.	FCB PCB CN55-83		Not used
CN1-84	GND	FCB PCB CN55-84	_____0V	Ground
CN1-85	GND	FCB PCB CN55-85	_____0V	Ground
CN1-86	GND	FCB PCB CN55-86	_____0V	Ground

Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-87	nPDLRD	FCB PCB CN55-87	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Low Enable
CN1-88	nPDLRST	FCB PCB CN55-88	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Low Enable
CN1-89	PD[2]	FCB PCB CN55-89	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-90	PD[3]	FCB PCB CN55-90	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-91	PD[6]	FCB PCB CN55-91	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-92	PD[7]	FCB PCB CN55-92	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-93	GND	FCB PCB CN55-93	<div> <div>0V</div>  </div>	Ground
CN1-94	GND	FCB PCB CN55-94	<div> <div>0V</div>  </div>	Ground
CN1-95	PD[10]	FCB PCB CN55-95	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-96	PD[11]	FCB PCB CN55-96	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-97	PD[14]	FCB PCB CN55-97	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal
CN1-98	PD[15]	FCB PCB CN55-98	<div> <div>5V(H)</div> <div>0V(L)</div>  </div>	Data Signal

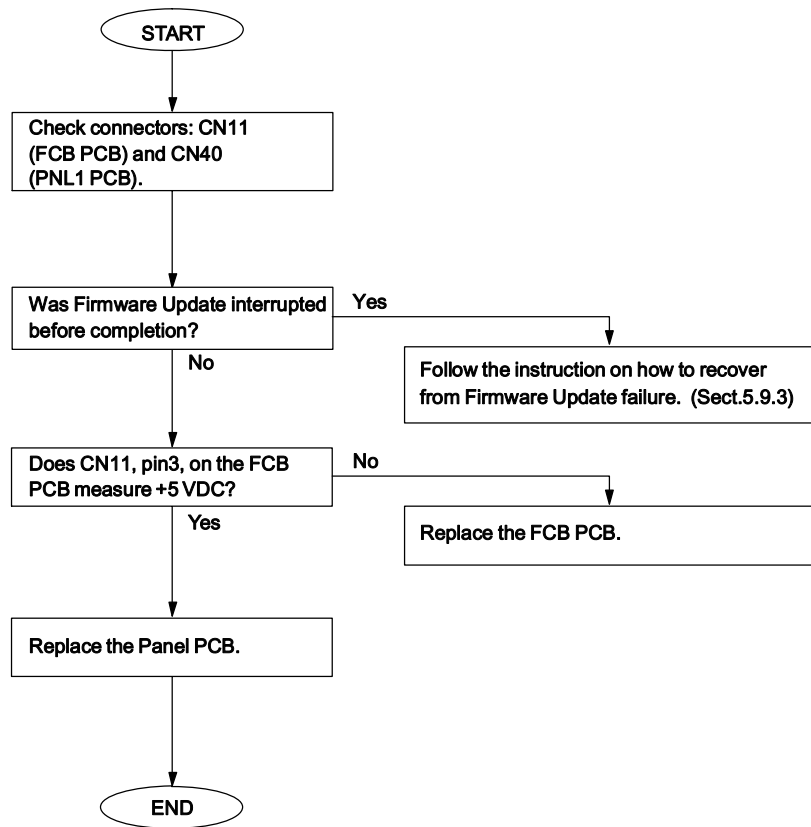
Pin No.	Signal Name	Destination	Signal Waveform	Function
CN1-99	+5V	FCB PCB CN55-99	 +5V	+5 VDC Power Supply
CN1-100	+5V	FCB PCB CN55-100	 +5V	+5 VDC Power Supply

4 Troubleshooting

4.1. Initial Troubleshooting Flowchart



4.2. Improper LCD Display

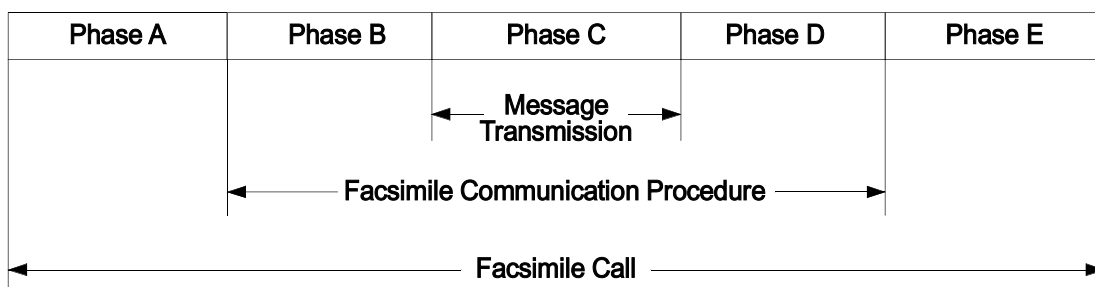


4.3. Information Codes (INFO. CODES)

The 3-digit information codes display to show the unit's status. These codes also print on the journal. The following table indicates appropriate sections for troubleshooting.

Code	Explanation	Phase	Section
001-003	Recording paper jam	C	4.3.8
007-008	Recording paper jam	C,D	4.3.8
010	No recording paper	B,C	4.3.9
030	Document misfeeding	B	4.3.10
031	Document too long	C	4.3.10
400	Transmission error	B	4.3.1
401	Transmission error	B	4.3.2
402	Transmission error	B	4.3.2
403	Polling reception error	B	4.3.12
404	Transmission error	B	4.3.3
405	Transmission error	B	4.3.3
407	Transmission error	D	4.3.3
408	Transmission error	D	4.3.5
409	Transmission error	D	4.3.5
411	Polling reception error	B	4.3.12
414	Polling reception error	B	4.3.12
415	Remote side mis-operation	B	4.3.12
416	Reception error	D	4.3.4
417	Reception error	C	4.3.5
418	Reception error	C	4.3.5
420	Reception error	B	4.3.1
422	Transmission error	B	4.3.2
434	Signal noise level too high	B	4.3.6
459	Reception error	C	4.3.7
490	Reception error	C	4.3.5
494	Reception error	C	4.3.7
495	Reception error	C	4.3.7
630	Remote unit busy	B	4.3.11
634	No busy tone detected	B	--
710-726	Internet Communication Problems	—	4.7.5

Phase



Phase A: Call establishment

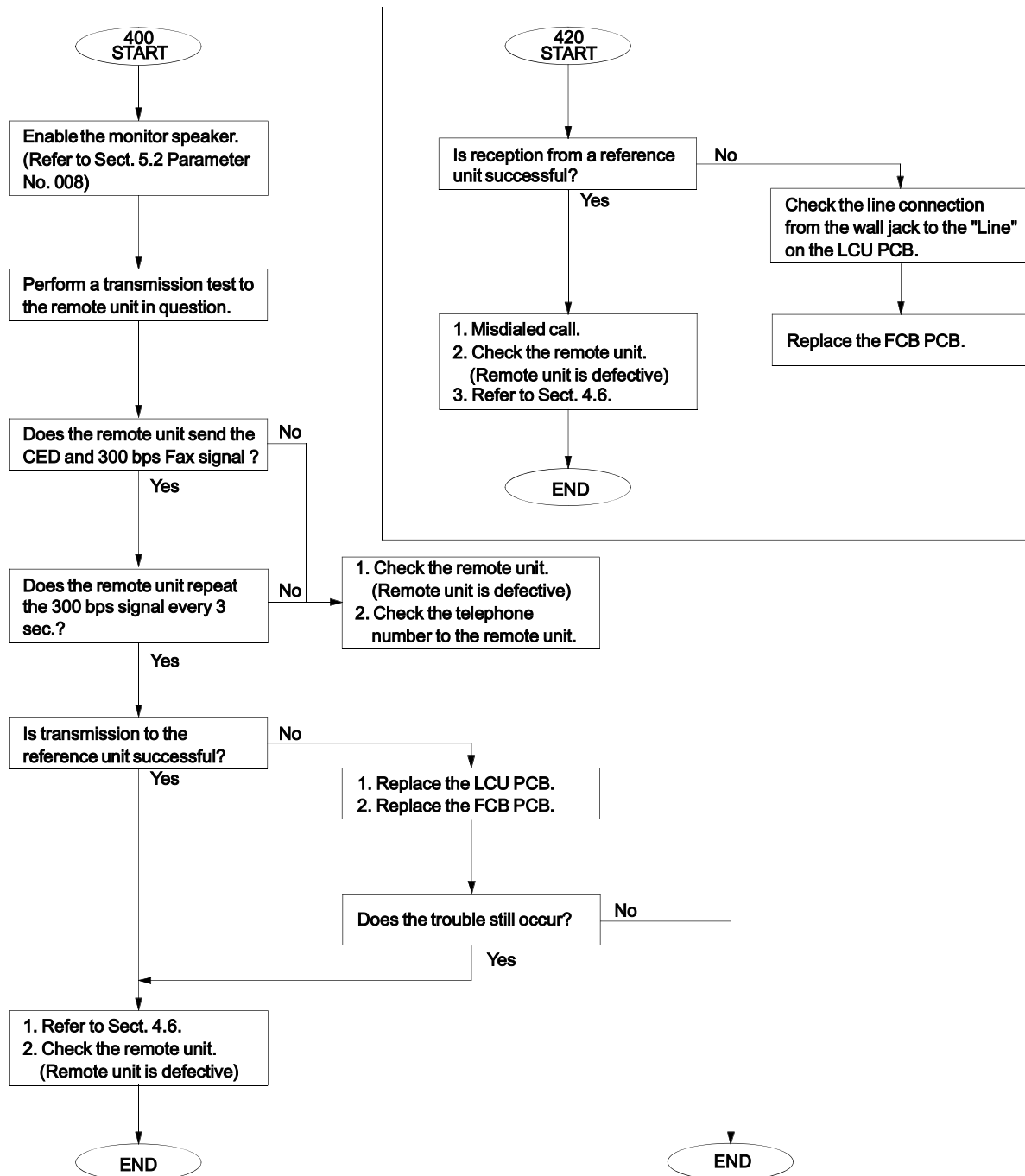
Phase B: Pre-message procedure

Phase C: Message transmission

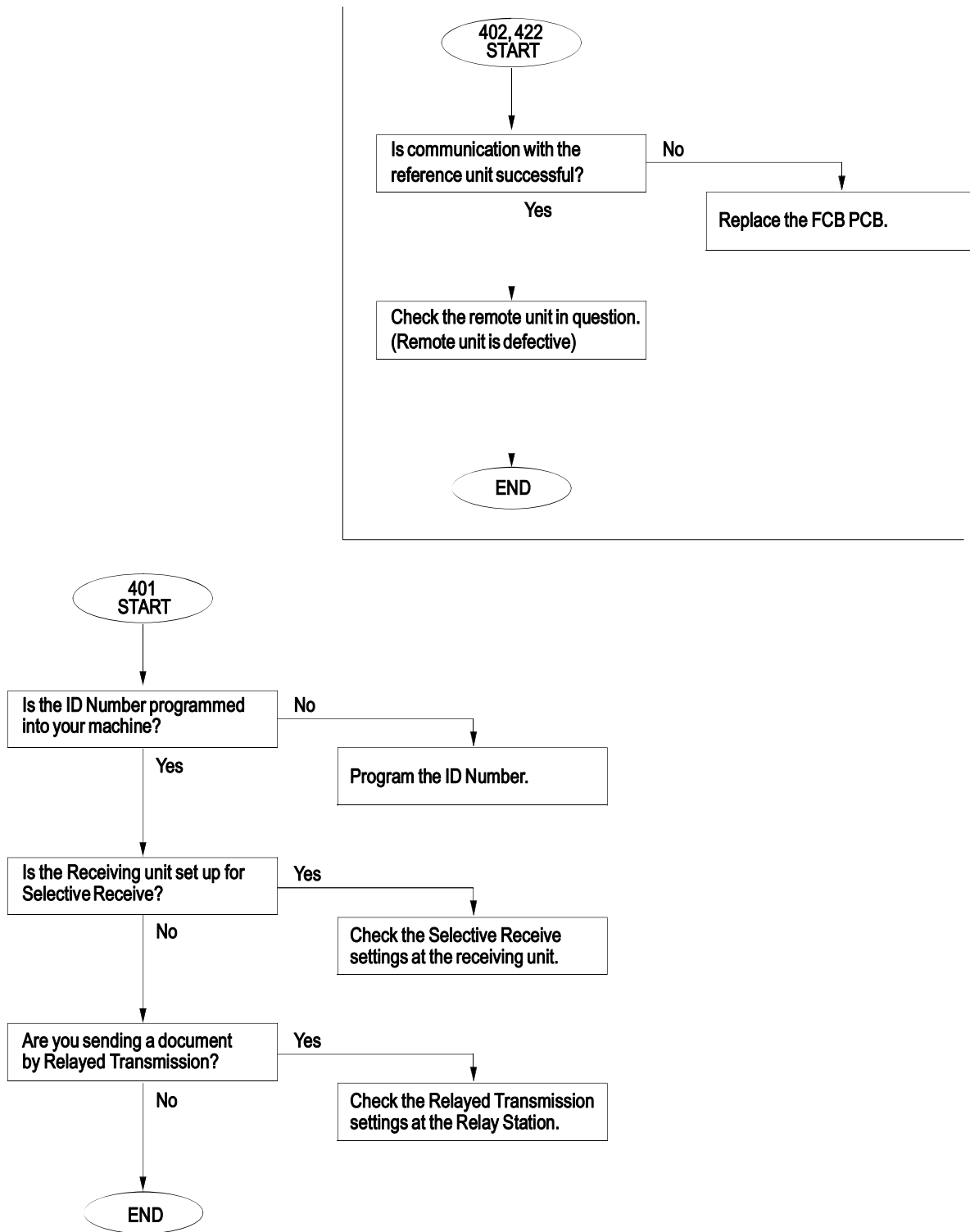
Phase D: Post-message procedure

Phase E: Call release

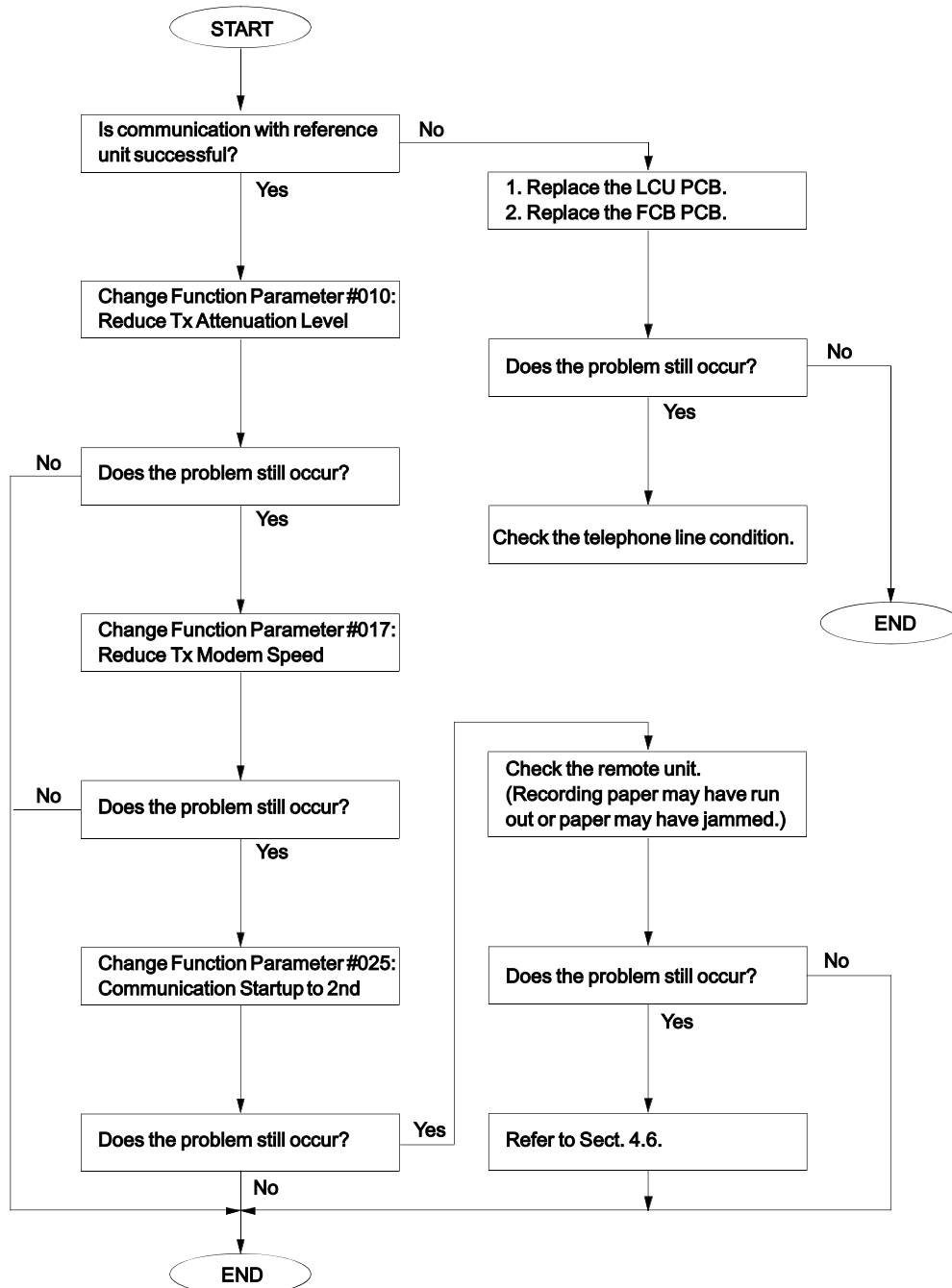
4.3.1. Information Codes: 400, 420



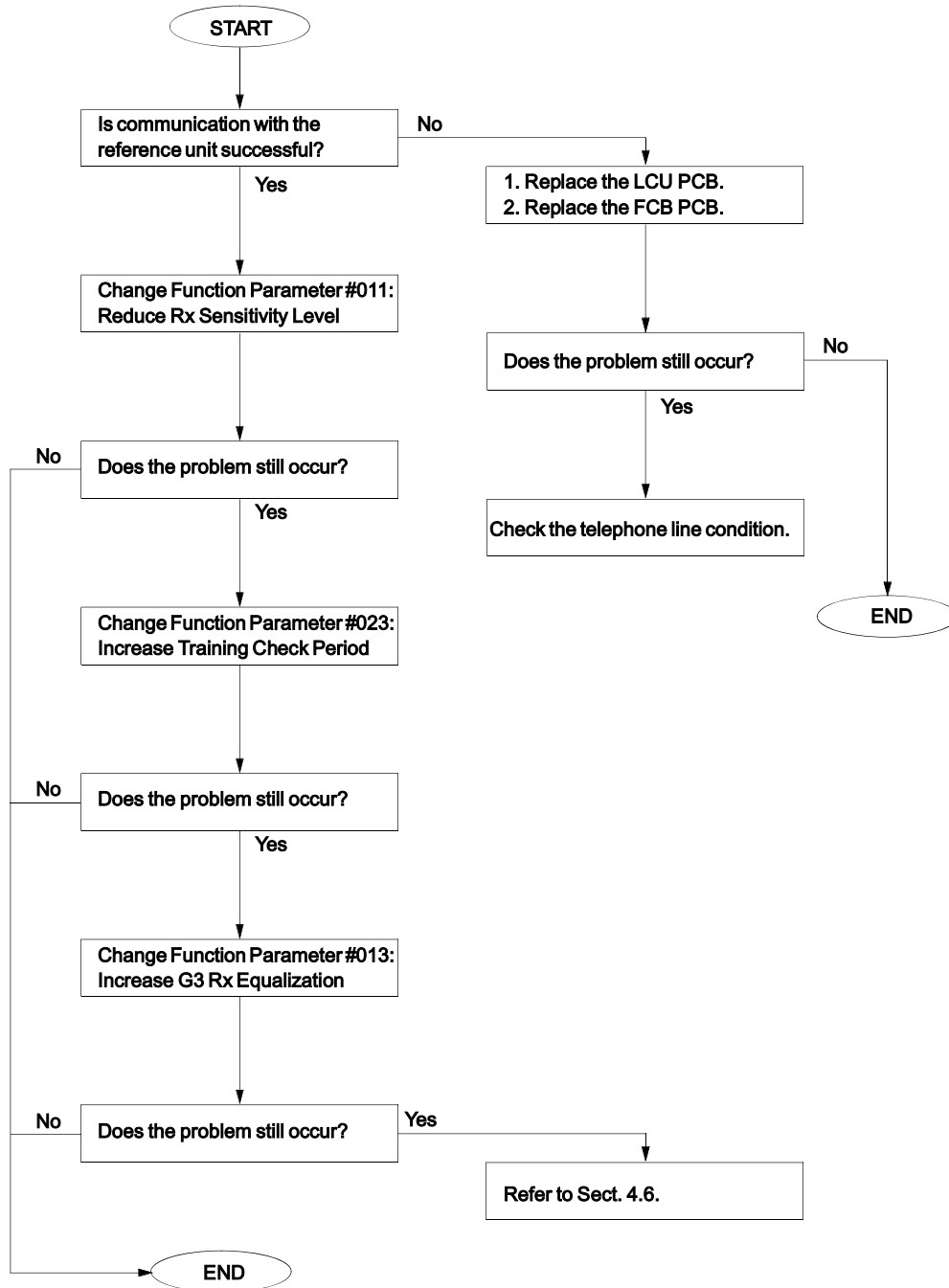
4.3.2. Information Codes: 401, 402, 422



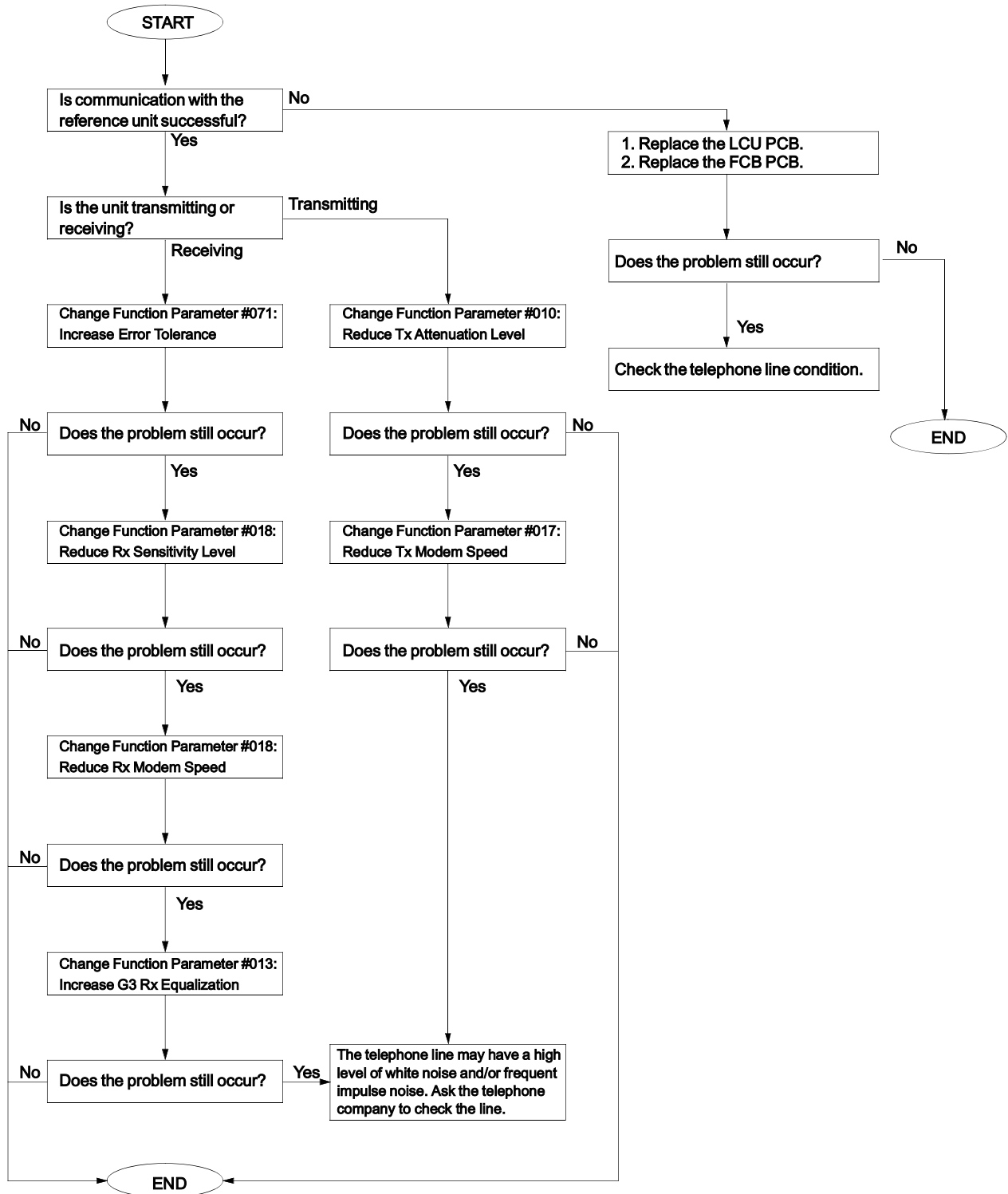
4.3.3. Information Codes: 404, 405, 407



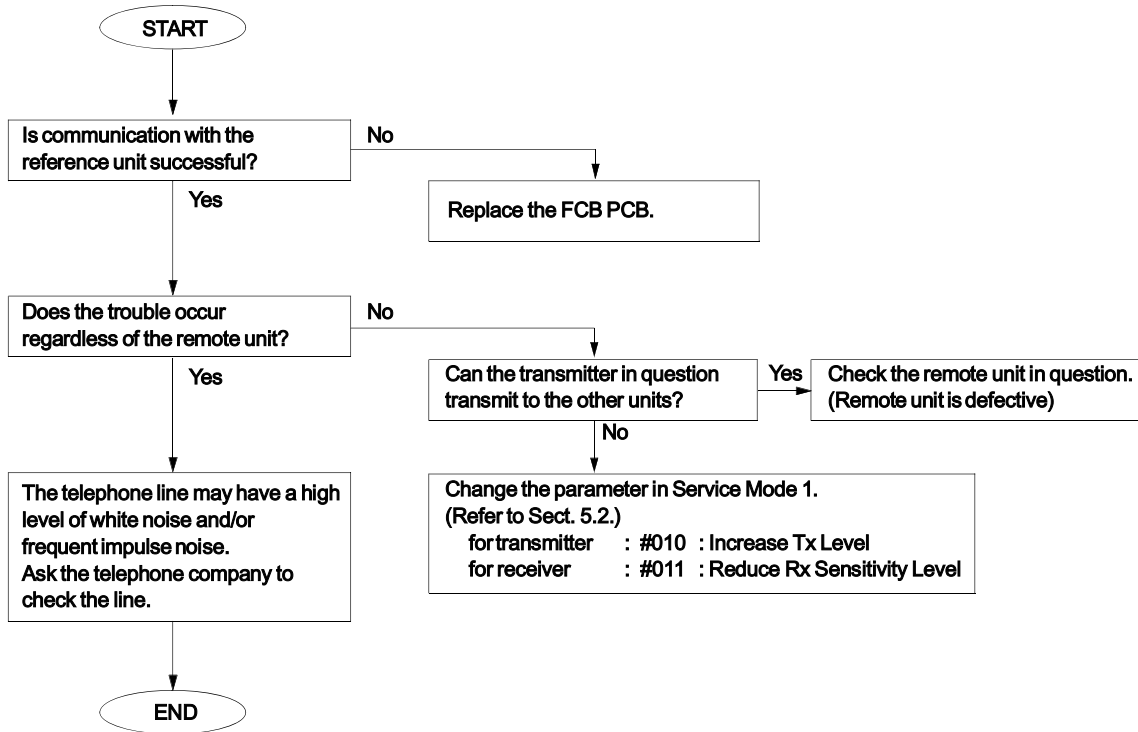
4.3.4. Information Code: 416



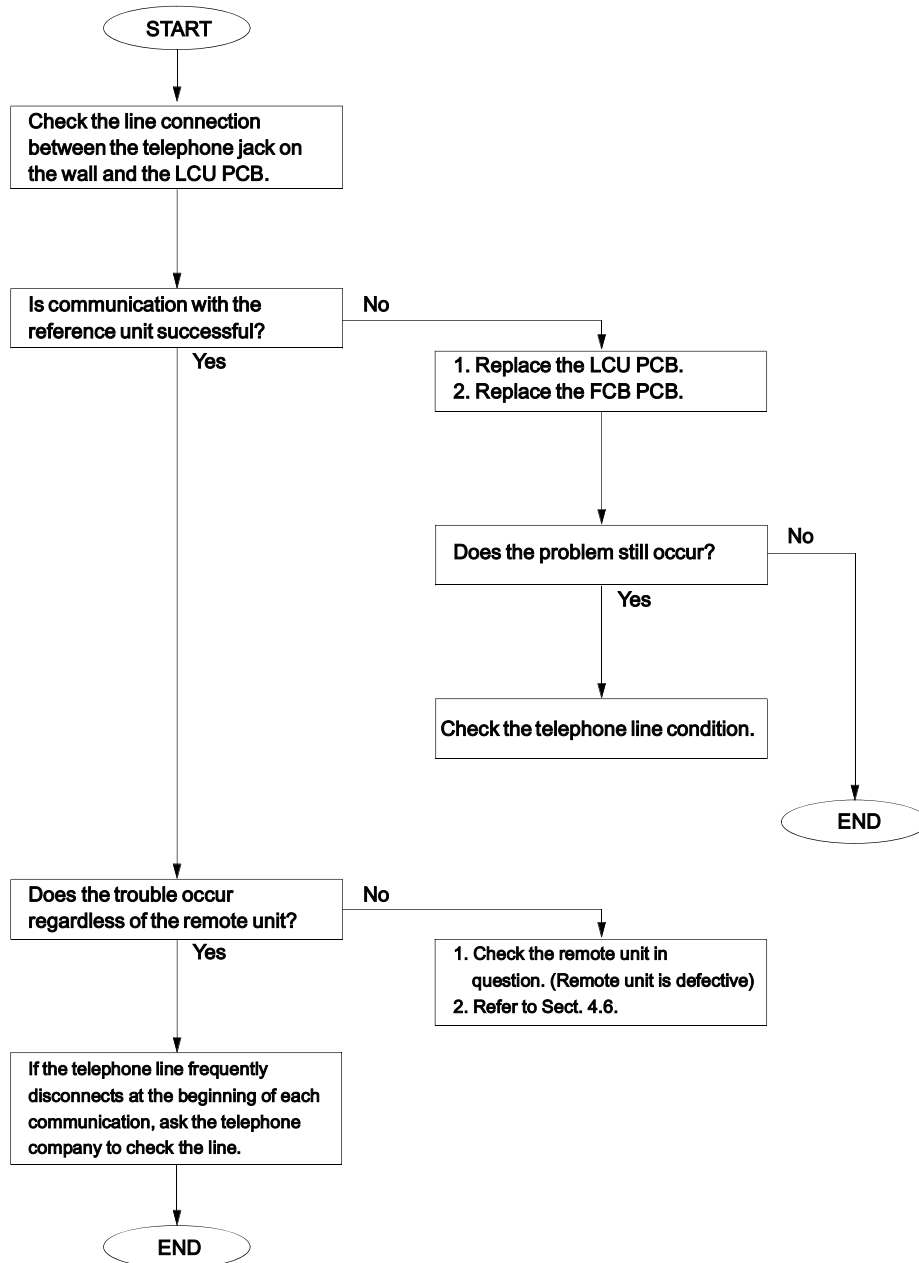
4.3.5. Information Codes: 408, 409, 417, 418, 490



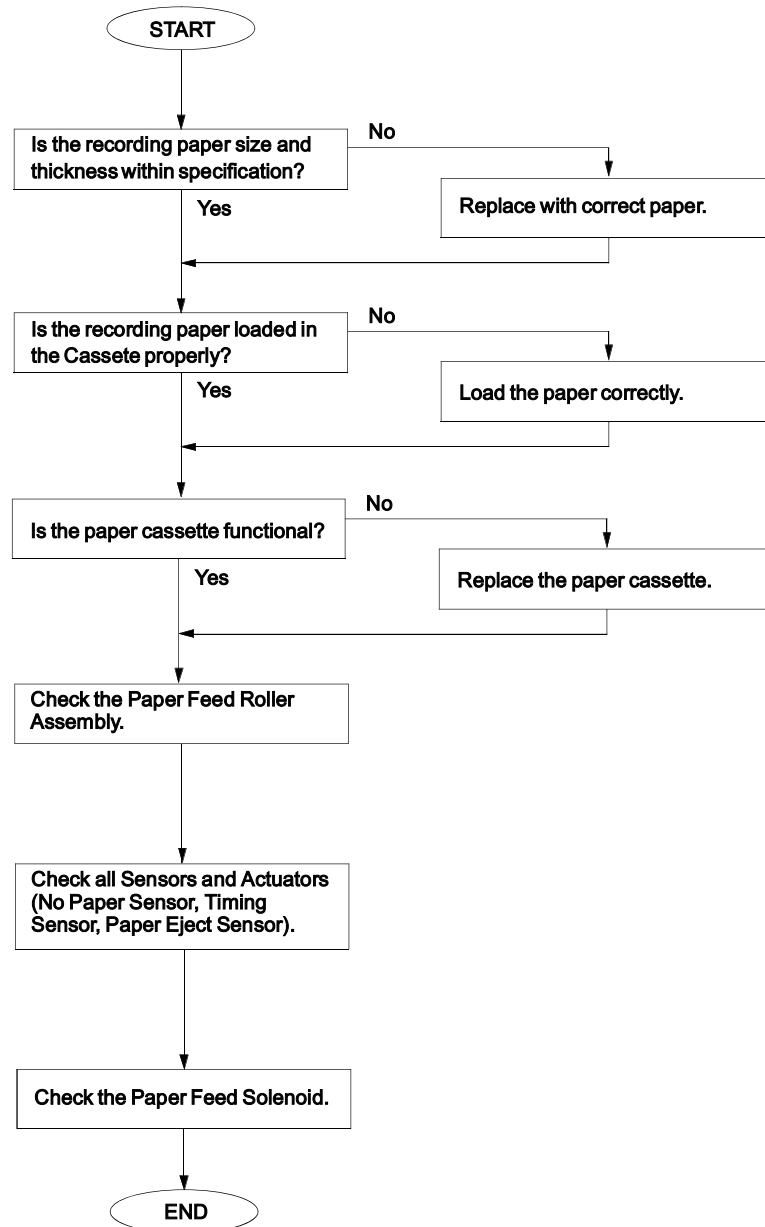
4.3.6. Information Code: 434



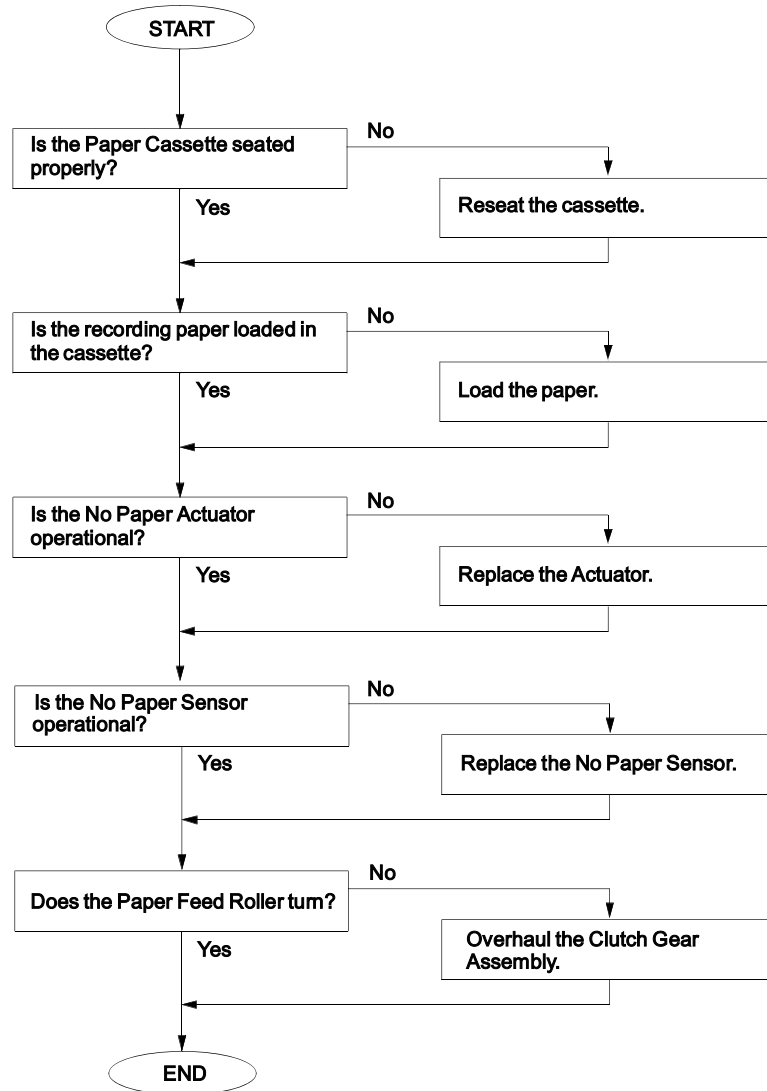
4.3.7. Information Codes: 459, 494, 495



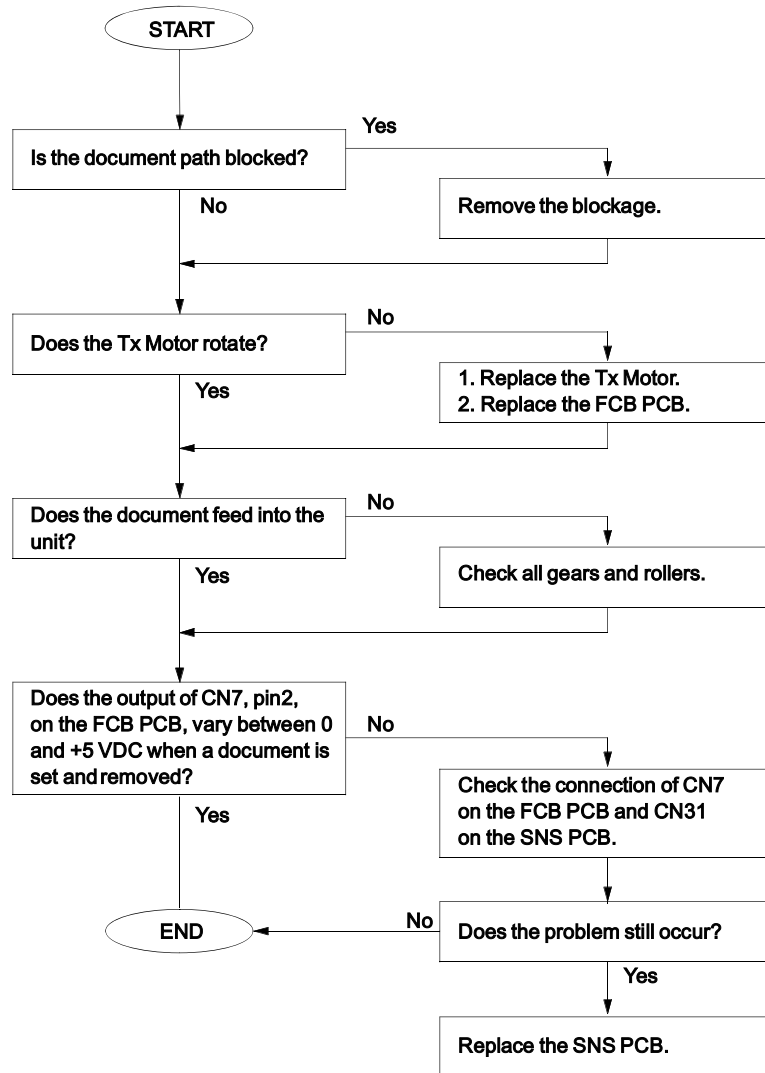
4.3.8. Information Codes: 001, 002, 003, 007, 008 (Recording Paper Jam)



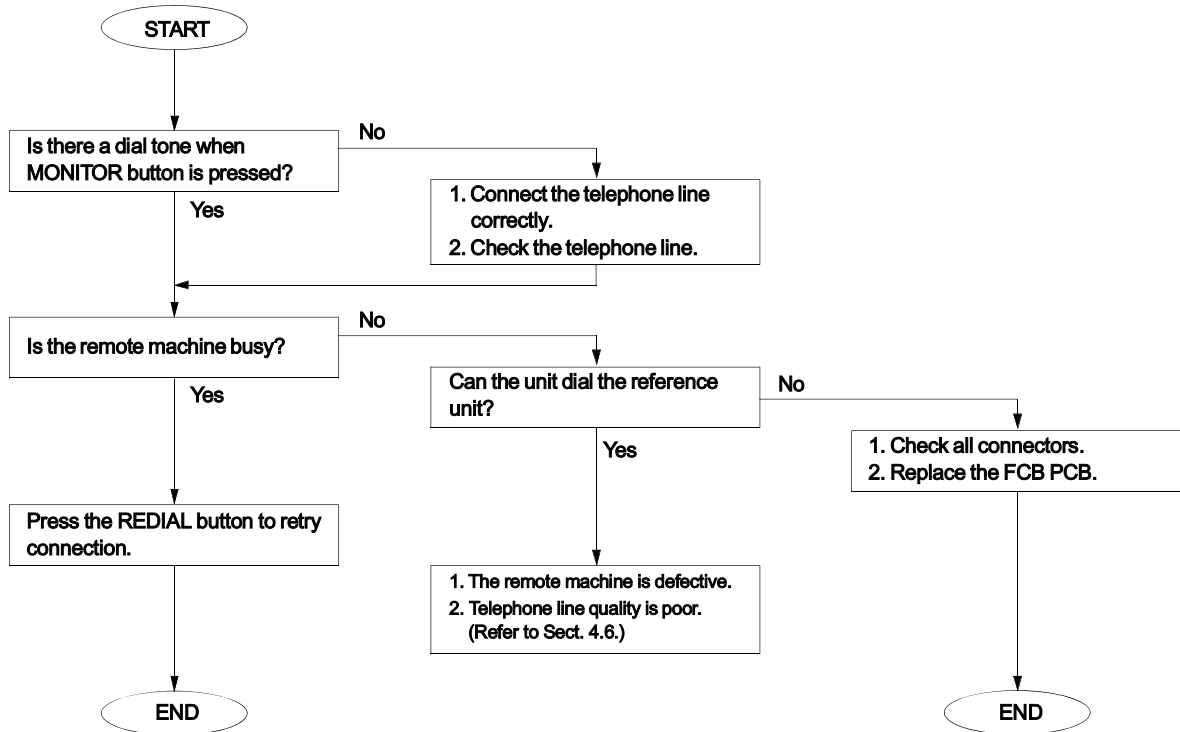
4.3.9. Information Code: 010 (No Recording Paper)



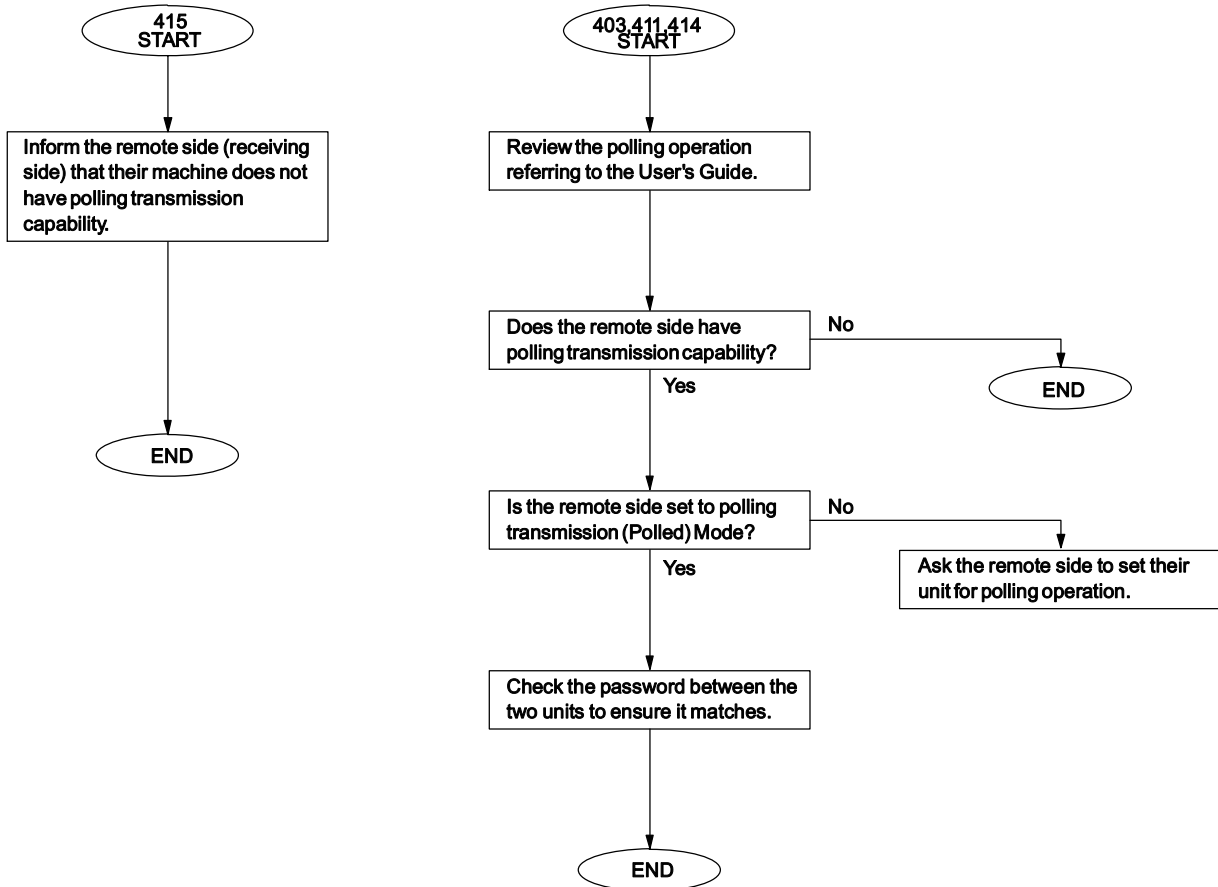
4.3.10. Information Codes: 030, 031 (Document Jam)



4.3.11. Information Code: 630 (Dialing Error)



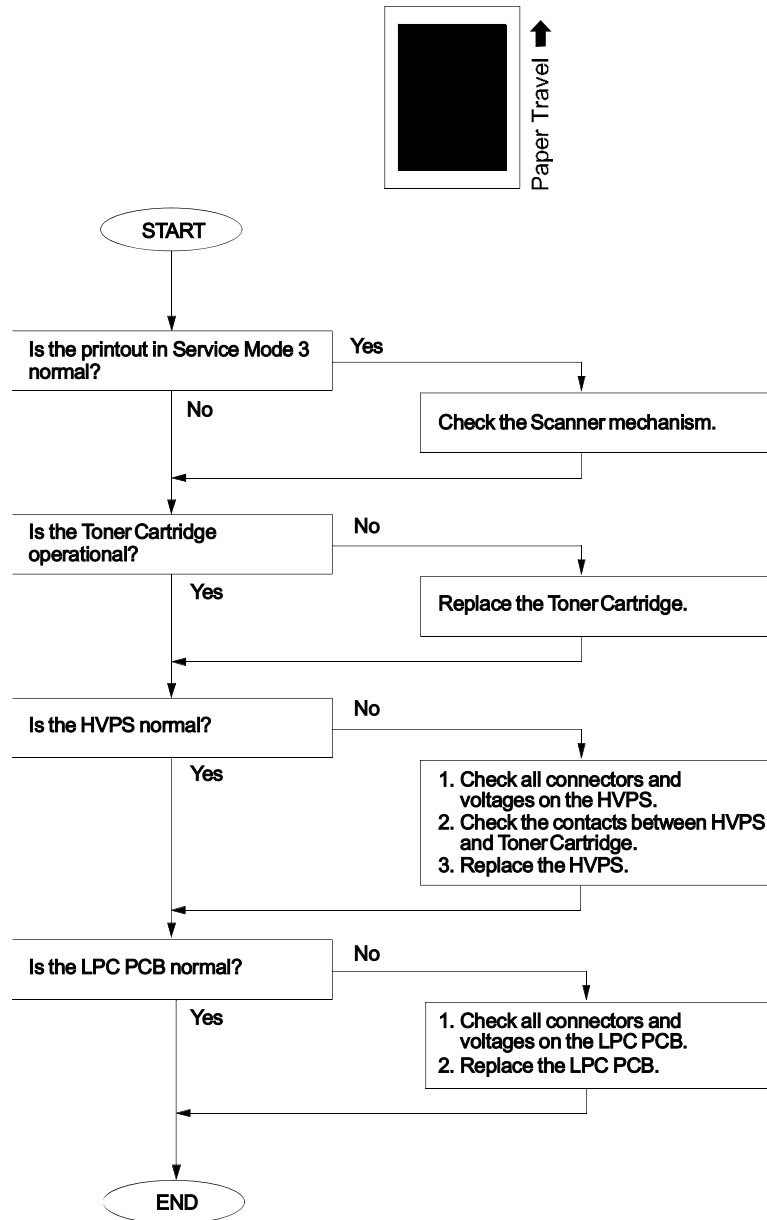
4.3.12. Information Codes: 403, 411, 414, 415 (Polling Operator Trouble)



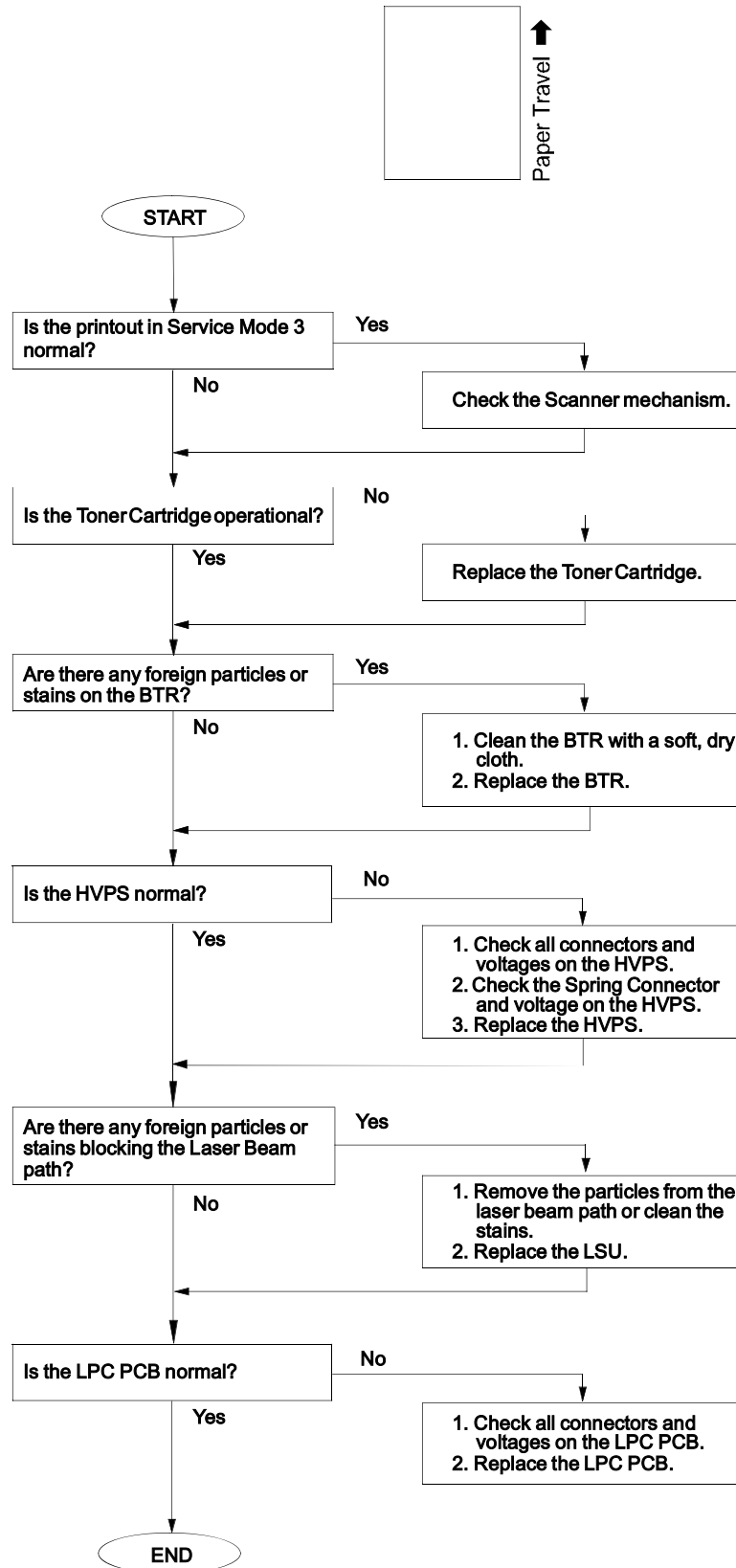
Polling communication with 4-digit password is not an ITU-T Standard feature.
If the transmitter and receiver are of different manufacturers, polling communication with password *may not* be possible.

4.4. Printed Copy Quality Problems

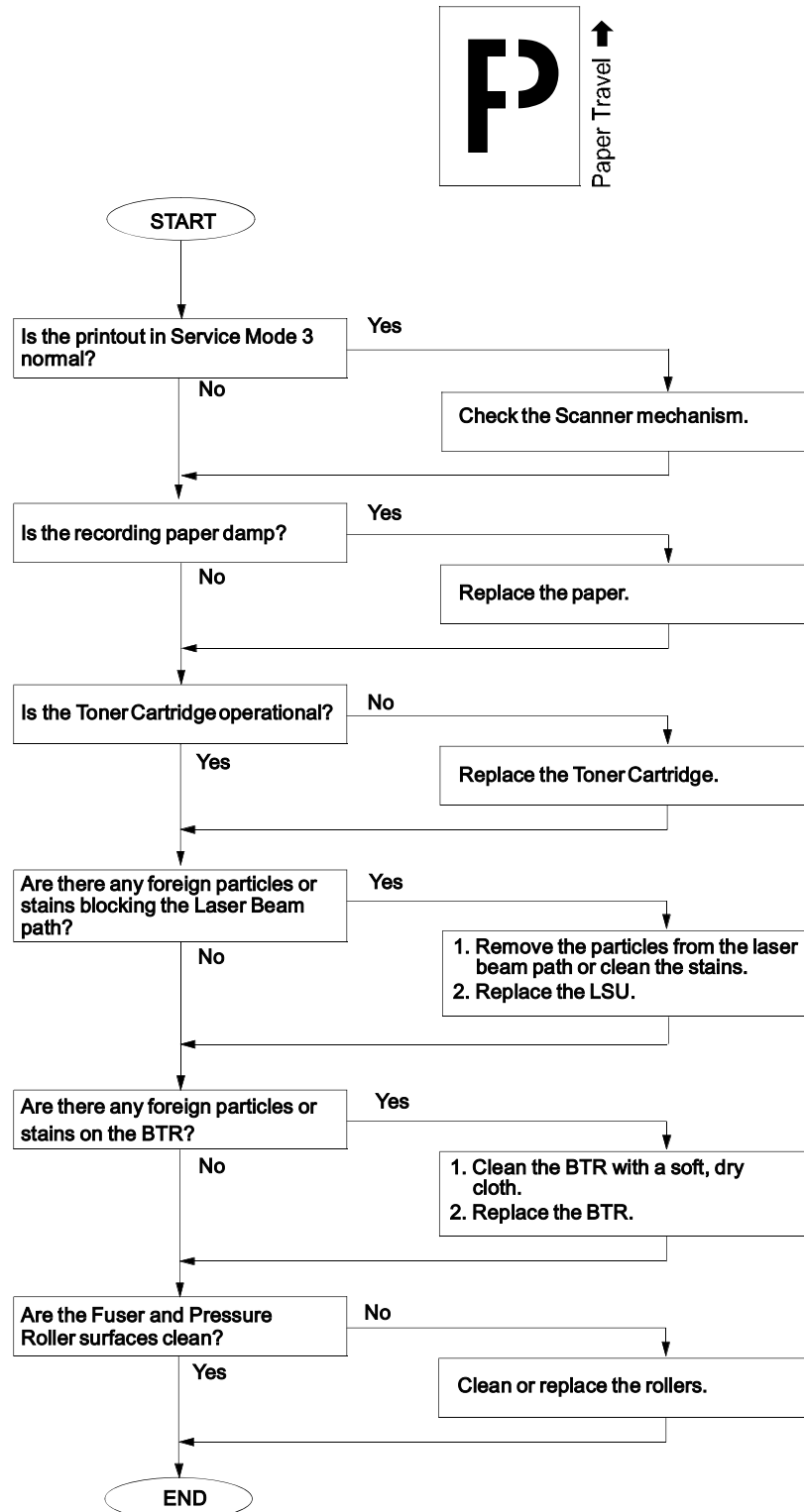
4.4.1. Black Copy



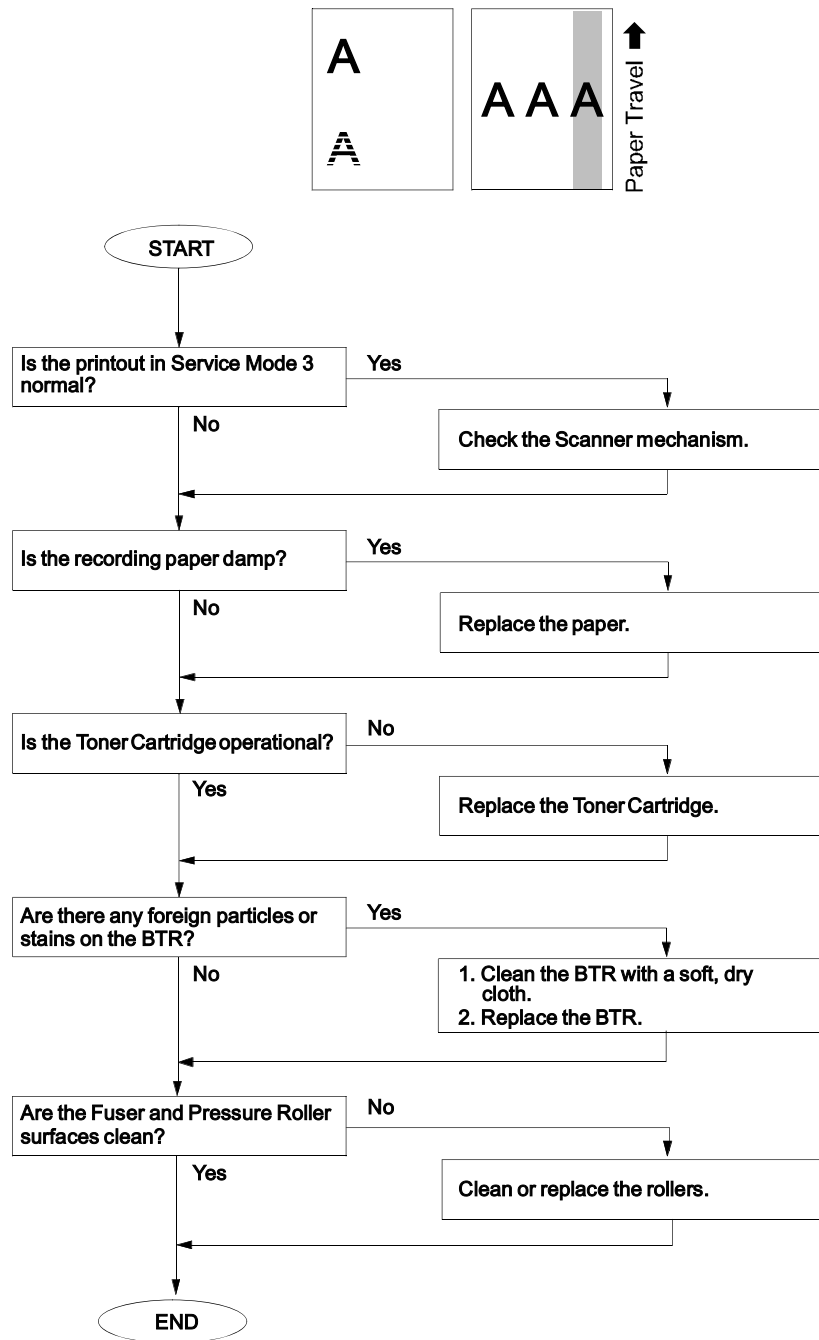
4.4.2. Blank Copy



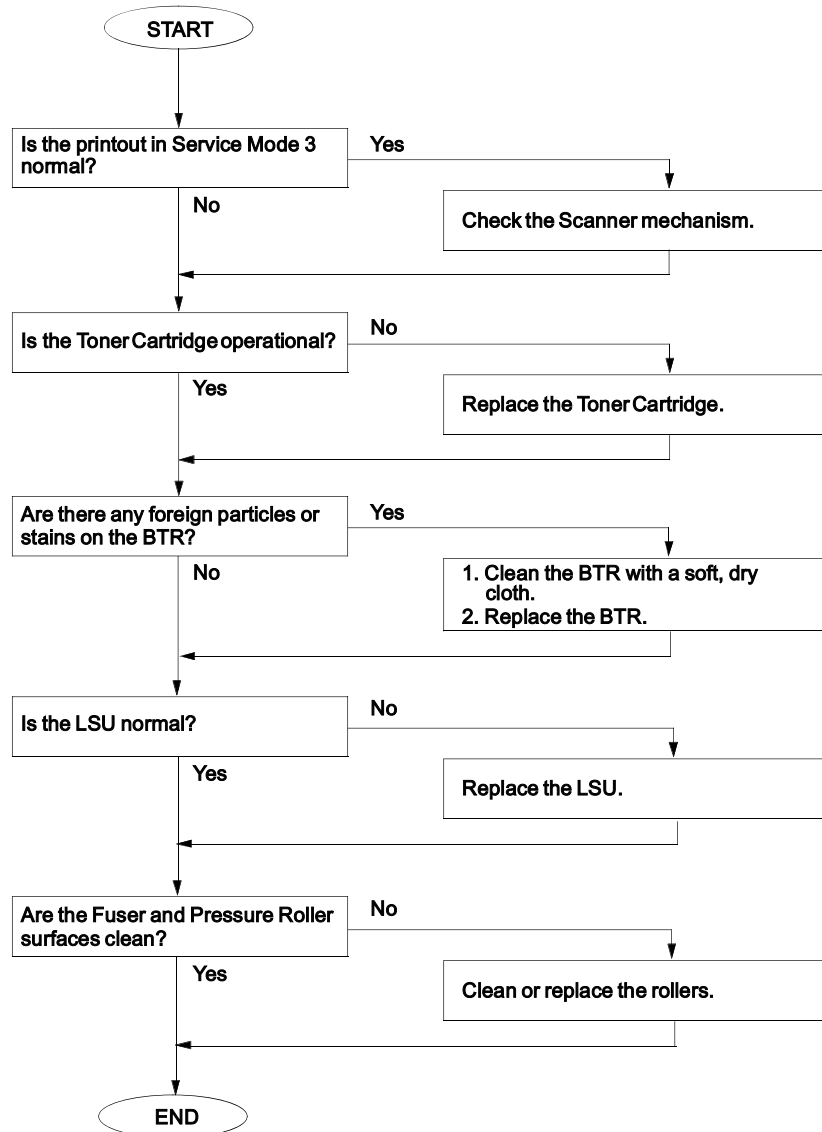
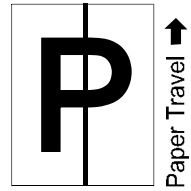
4.4.3. Vertical White Lines



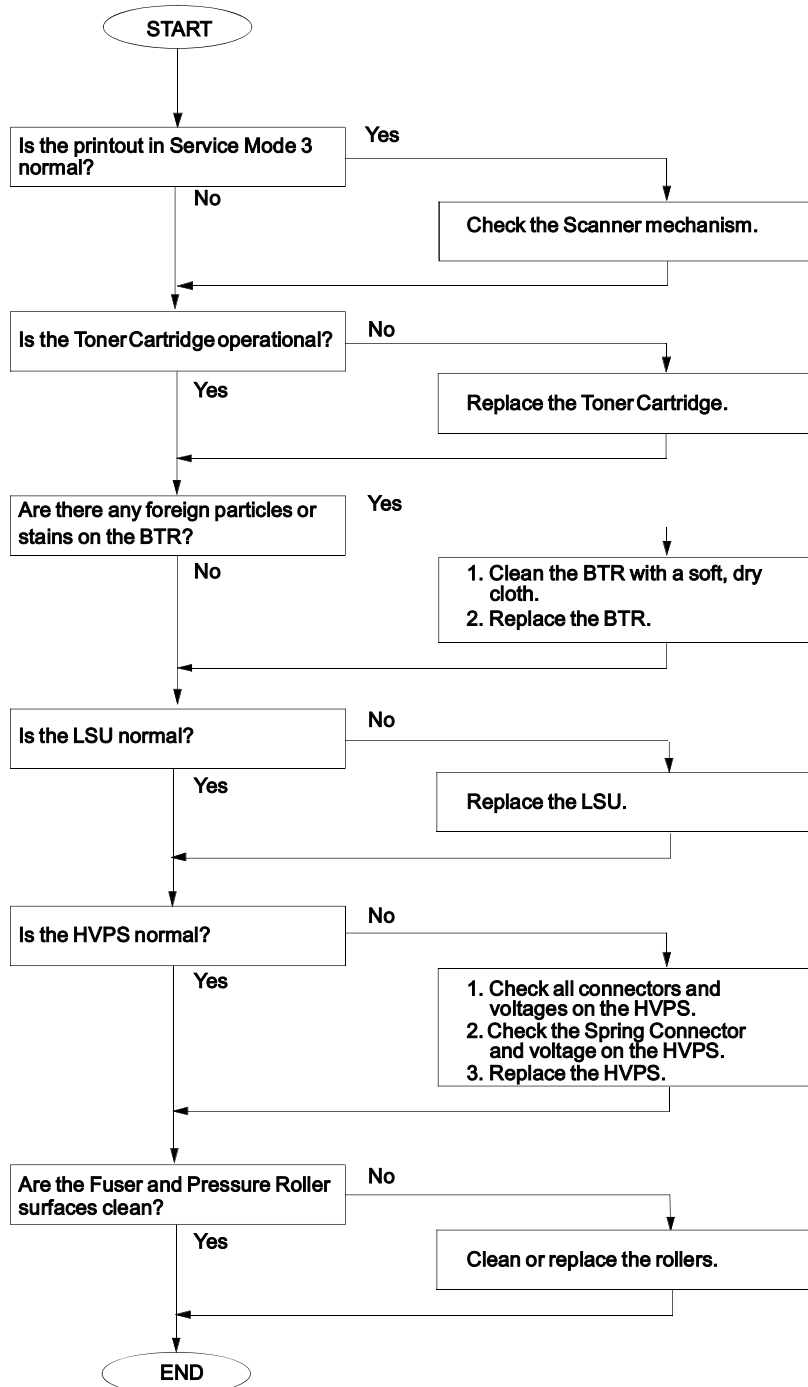
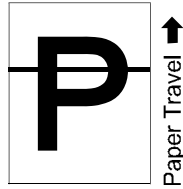
4.4.4. Ghost Images



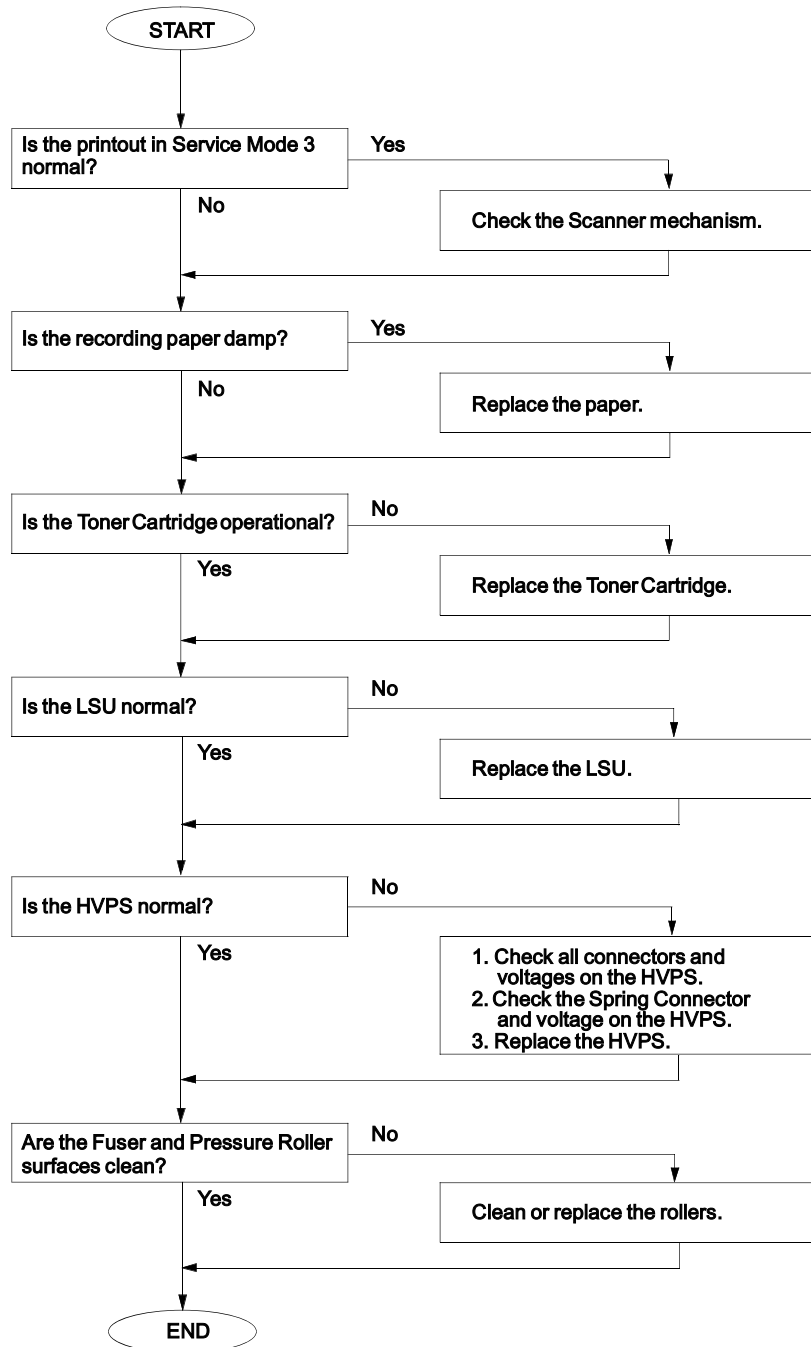
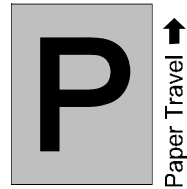
4.4.5. Vertical Dark Lines



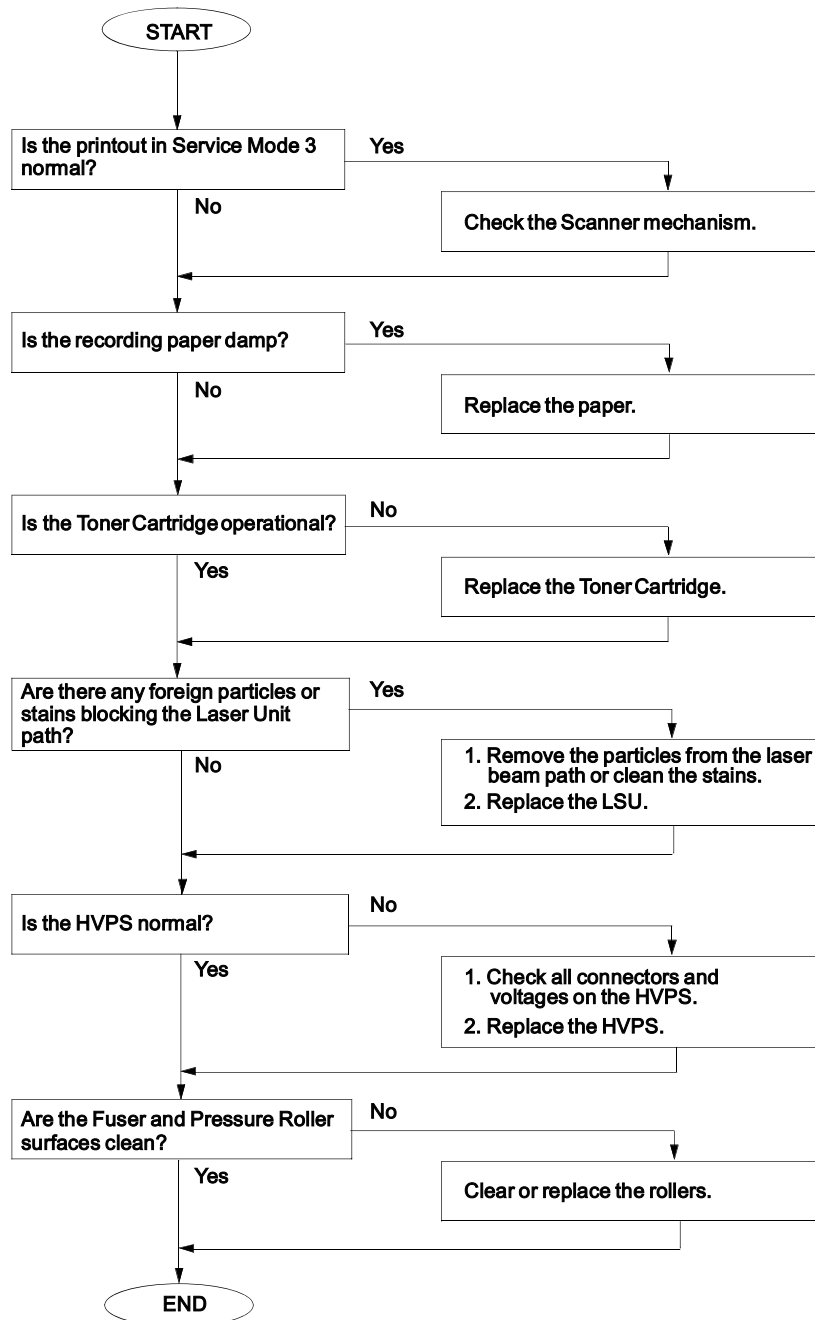
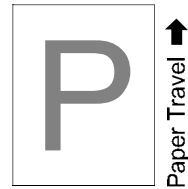
4.4.6. Horizontal Dark Lines



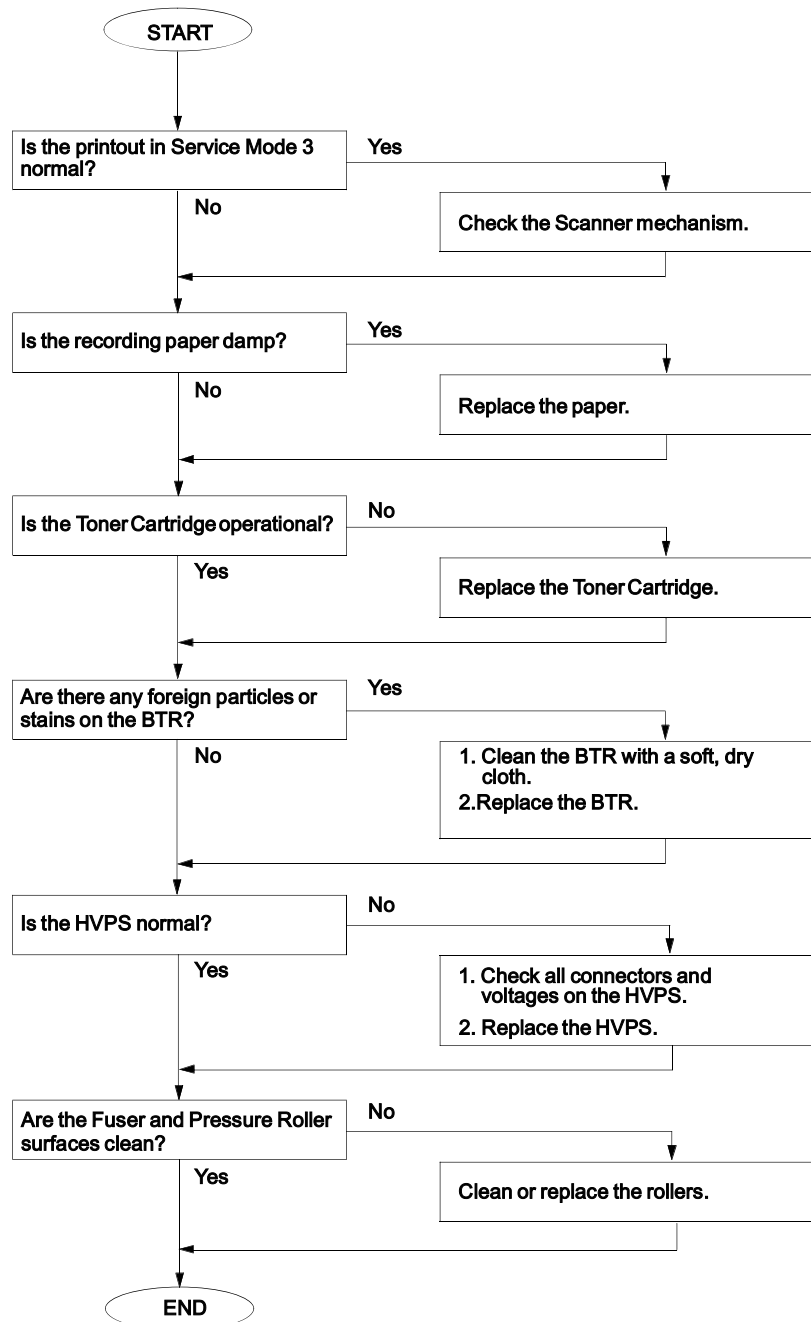
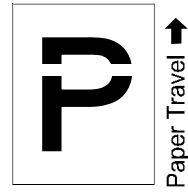
4.4.7. Dark Background



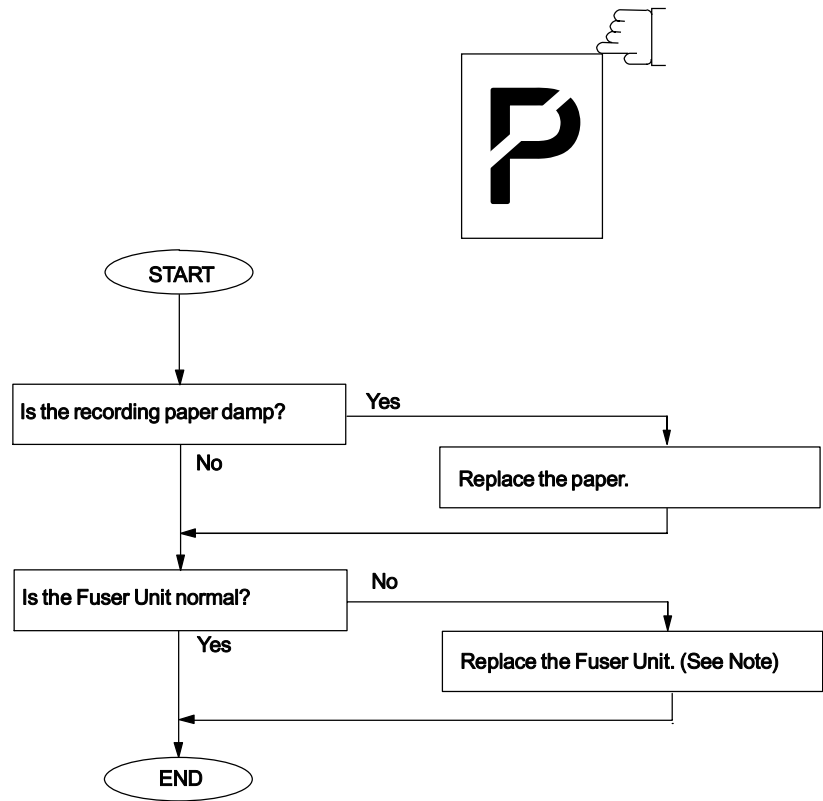
4.4.8. Light Print



4.4.9. Horizontal White Lines

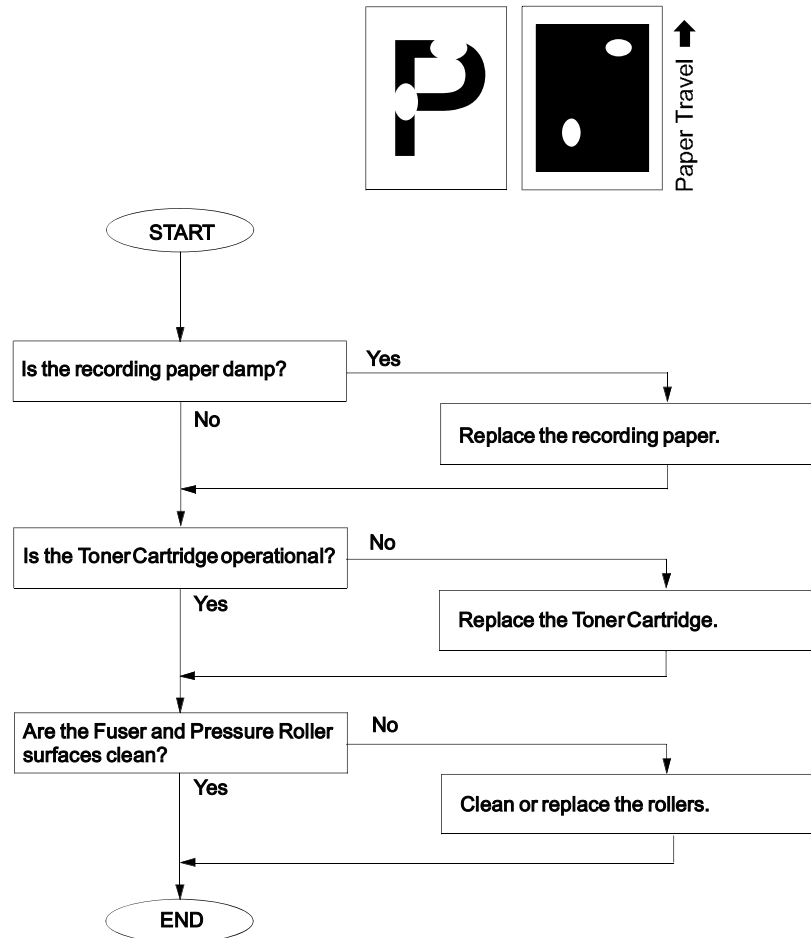


4.4.10. Improper Fusing (Printed image does not bond to the paper)

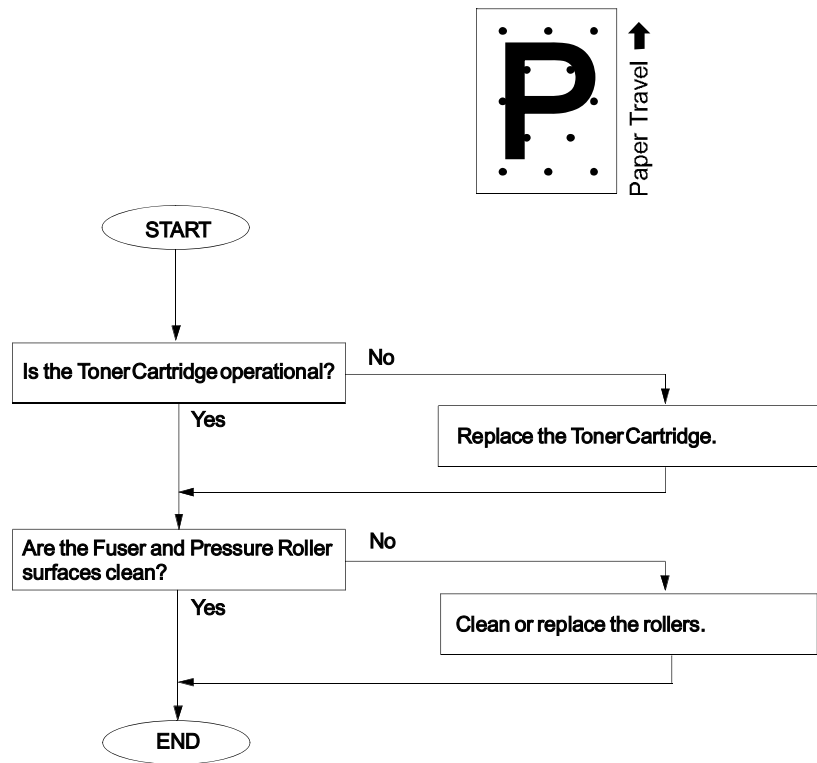


Note: Replace the entire Fuser Unit when the Thermostat and / or the Thermistor becomes open-circuit.

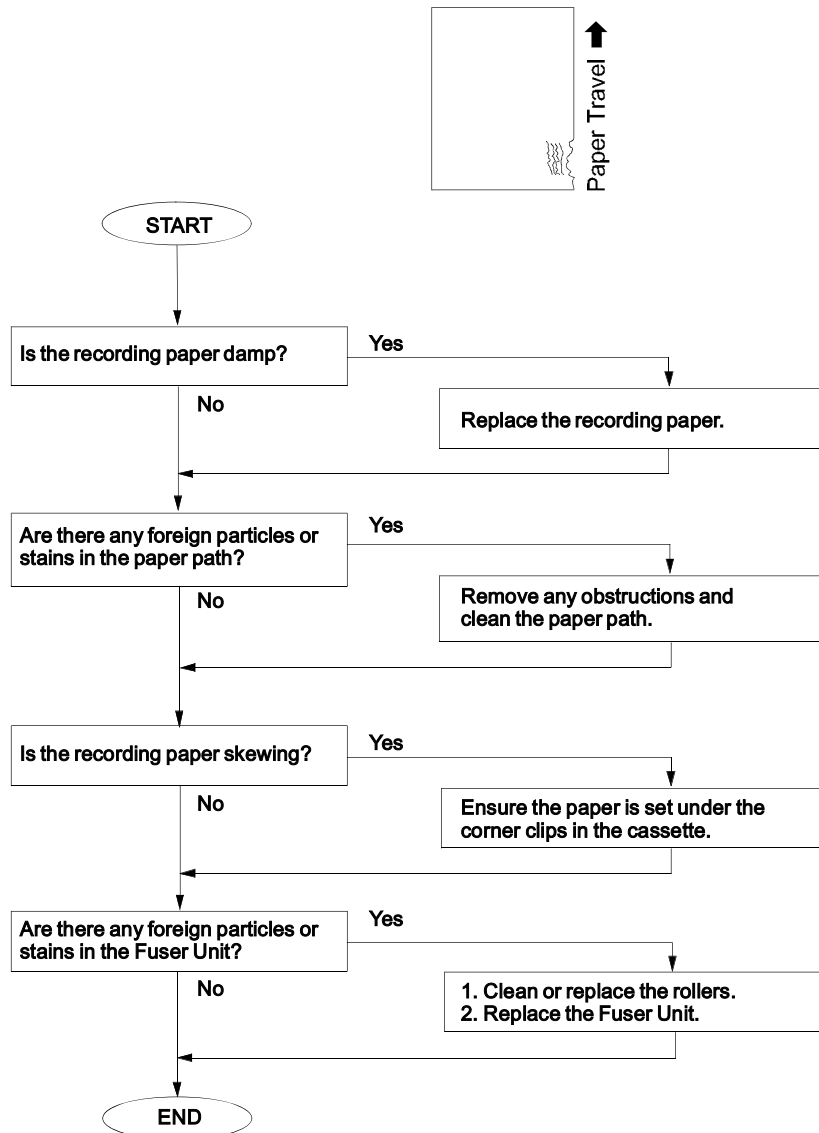
4.4.11. Voids in Solid Areas



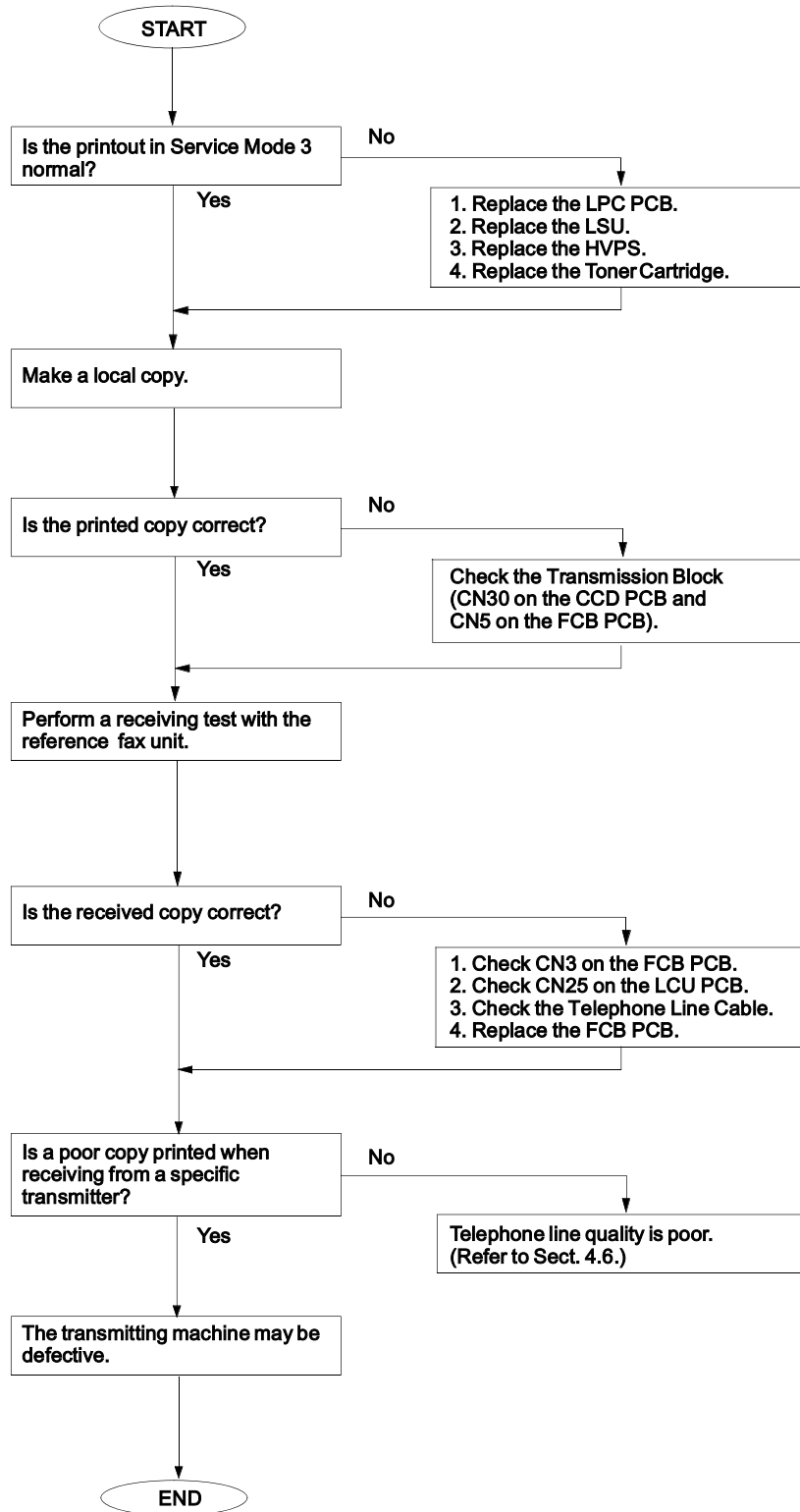
4.4.12. Black Dots



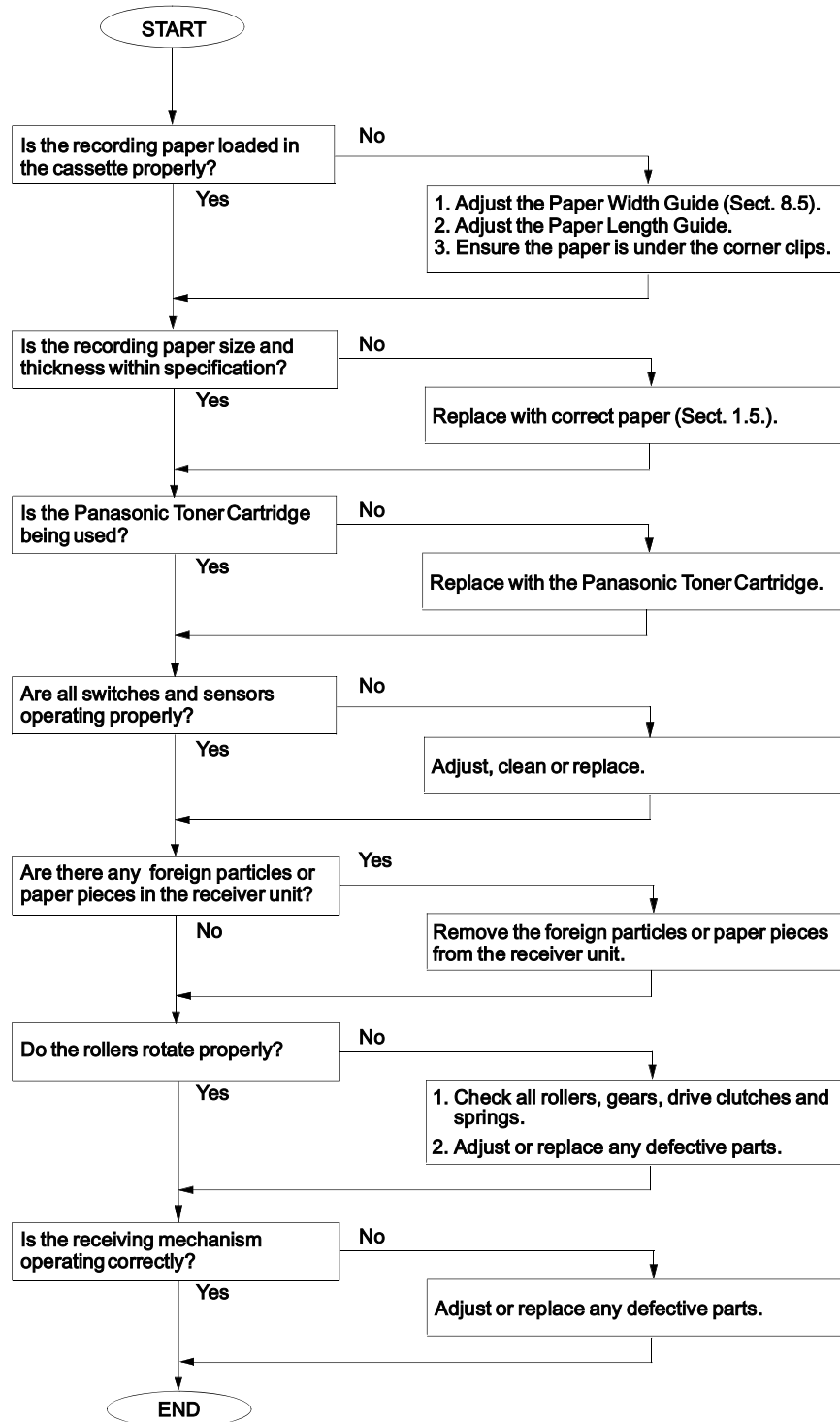
4.4.13. Recording Paper Creases



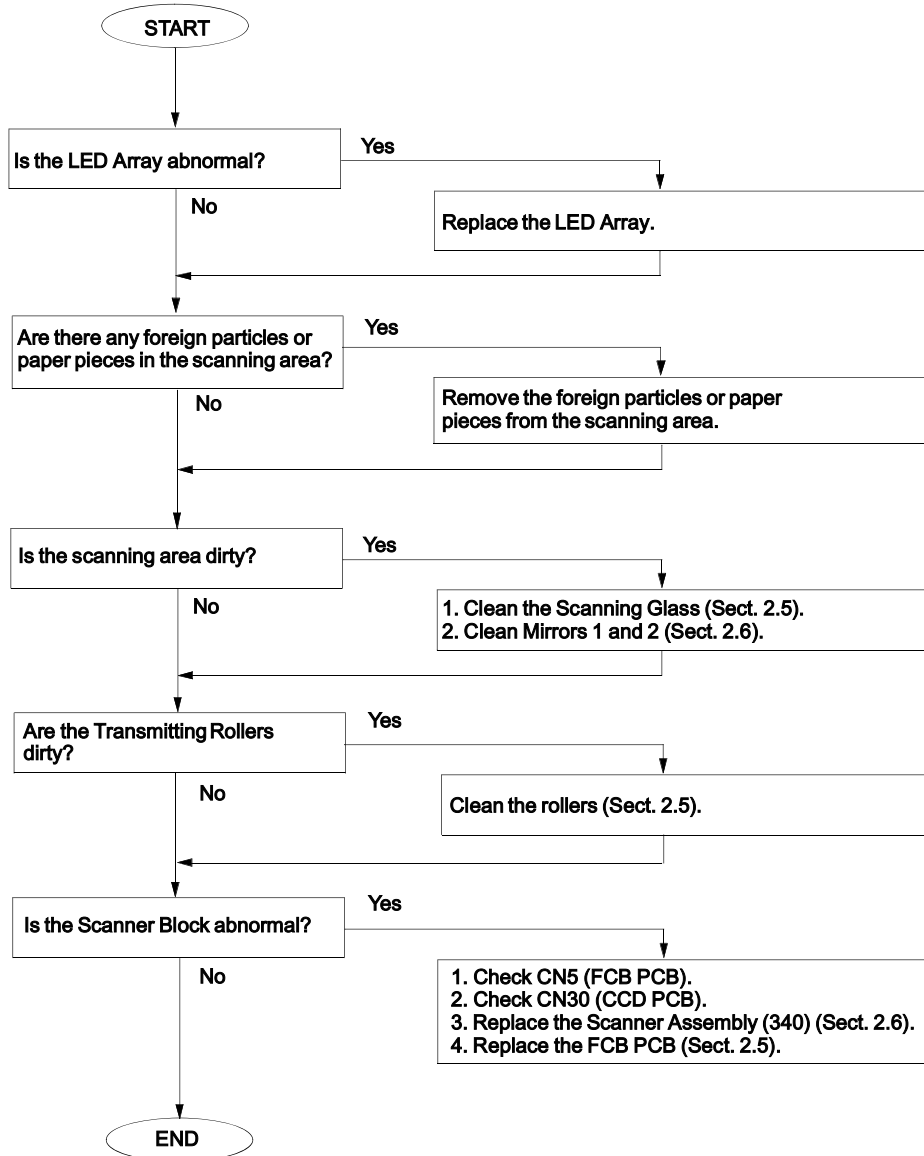
4.4.14. Poor Printed Copy Quality



4.4.15. Abnormal Printing



4.4.16. Scanned Copy Quality Problems

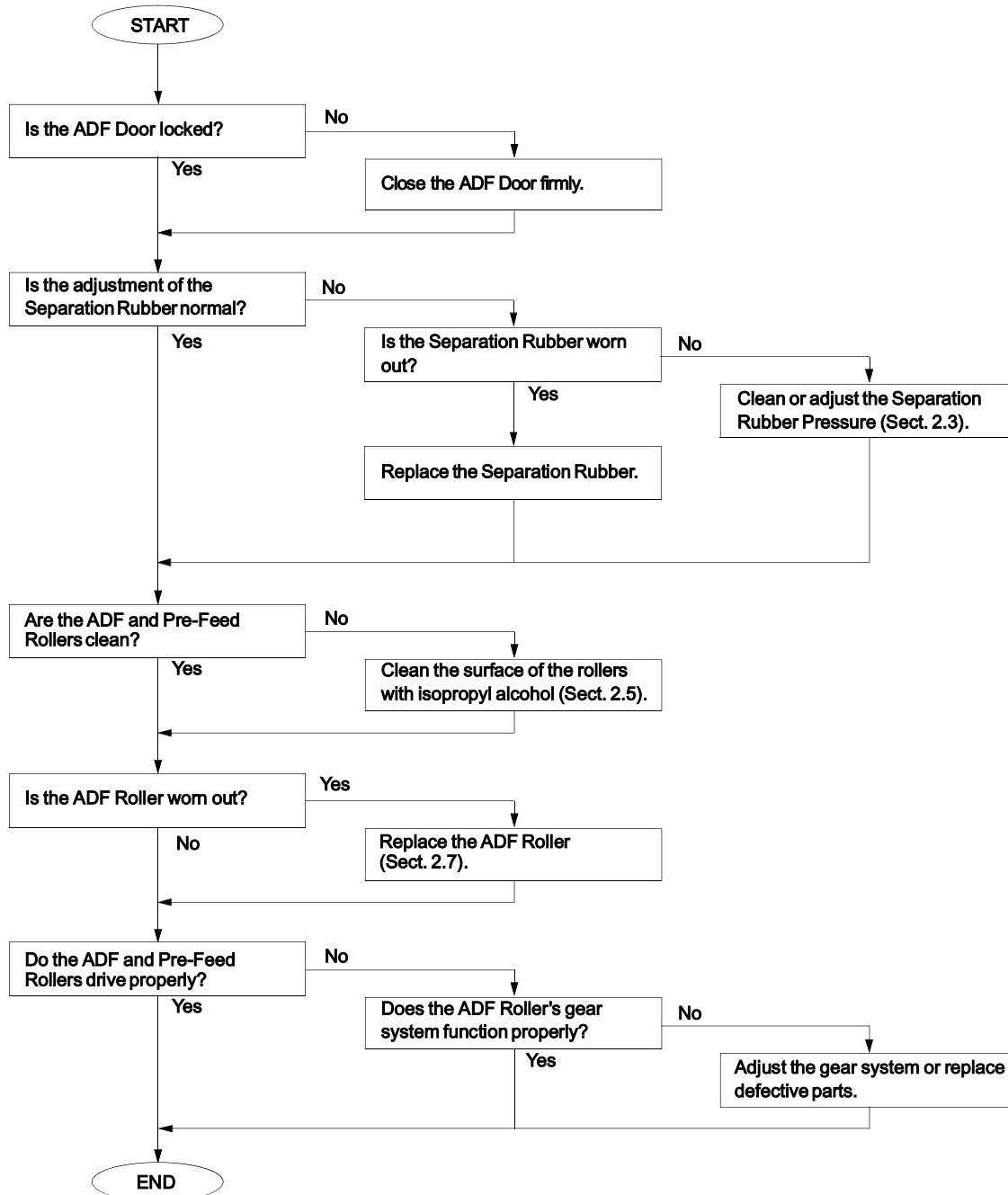


4.5.1. No Document Feed

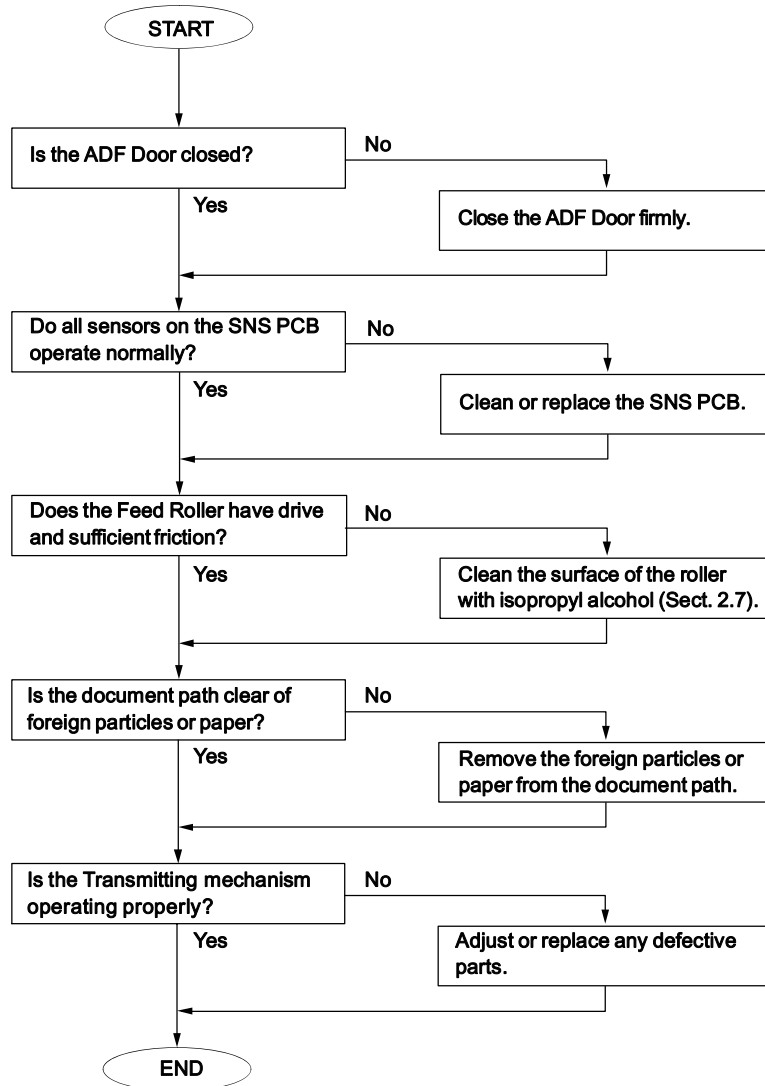
4.5.1. No Document Feed



4.5.2. Document does not feed or Multiple feeds



4.5.3. Document Jam (030) or Skewing

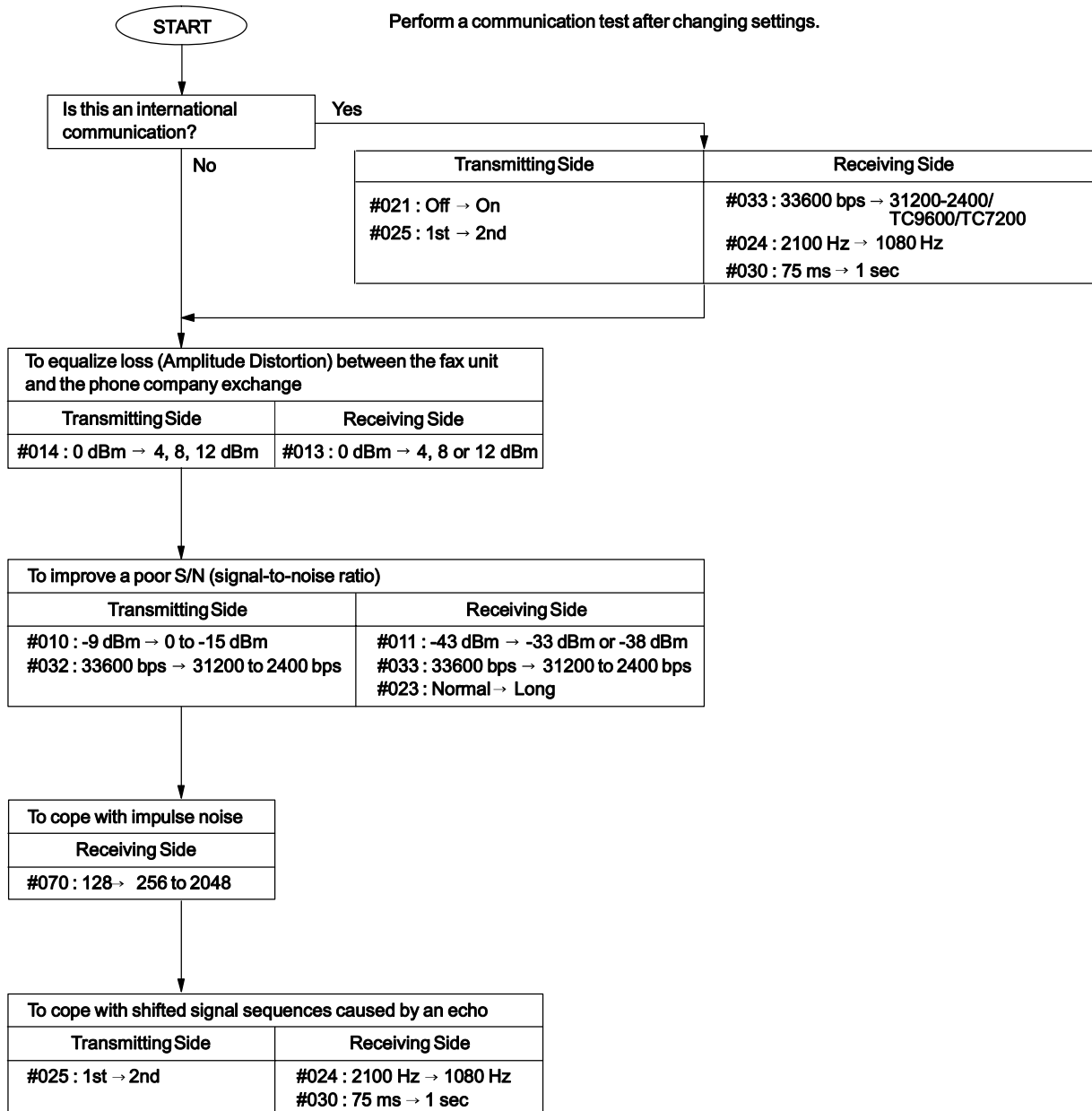


4.6. Communications

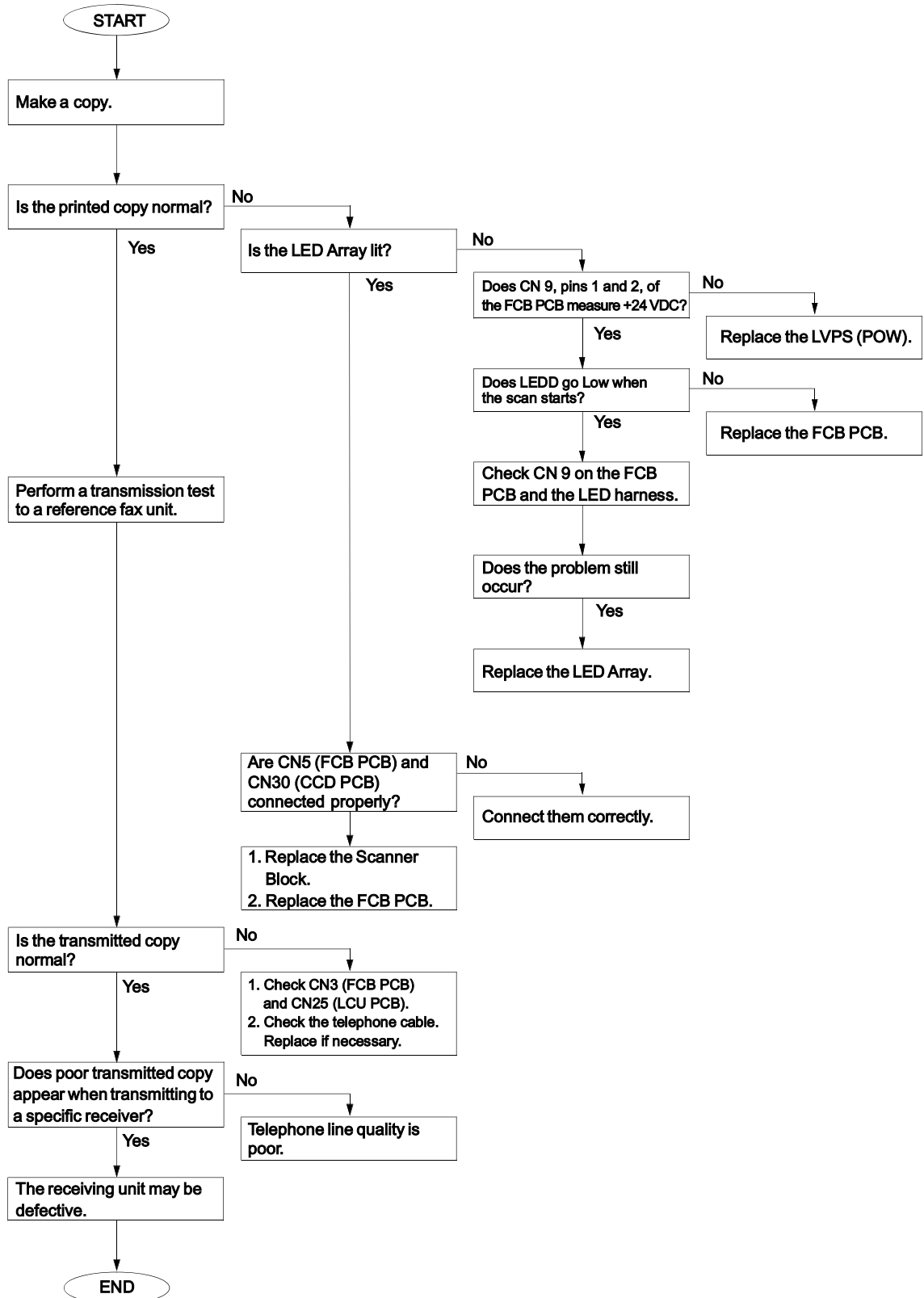
This section explains general troubleshooting procedures for the 400 series of Information Codes. These errors are primarily caused by poor telephone line quality (loss, noise, echo, etc.). This unit is furnished with Service Mode 1 to assist in troubleshooting line quality problems.

It is suggested that both the transmitting unit and receiving unit be adjusted. This section gives relevant parameters in Service Mode 1 for the transmitting and receiving sides. If no improvement is realized after the parameters are adjusted, it is recommended that the parameters be returned to the default settings.

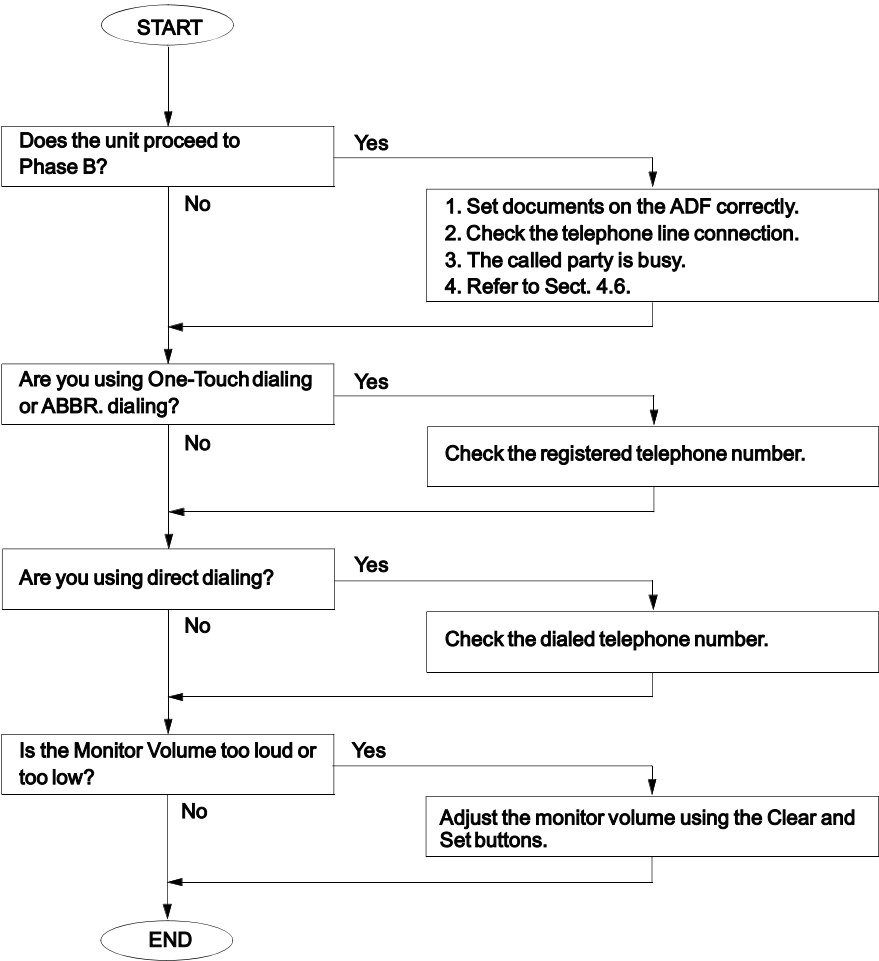
4.6.1. Communication Trouble



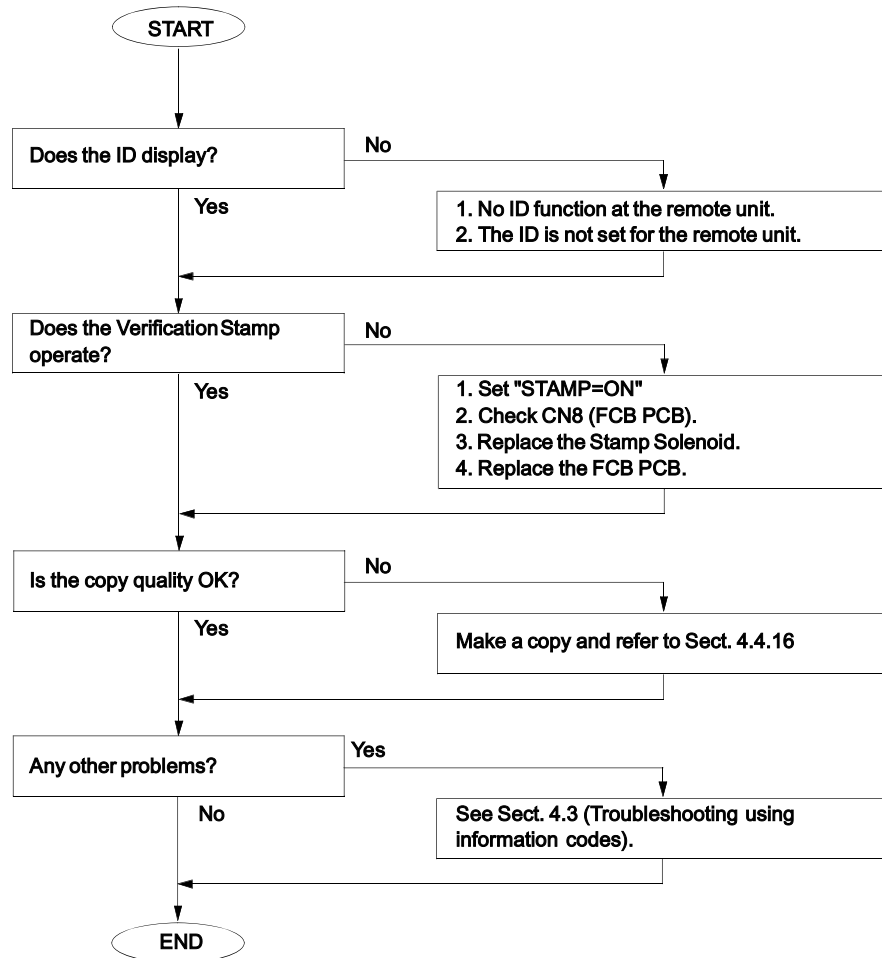
4.6.2. Poor Transmitted Copy Quality



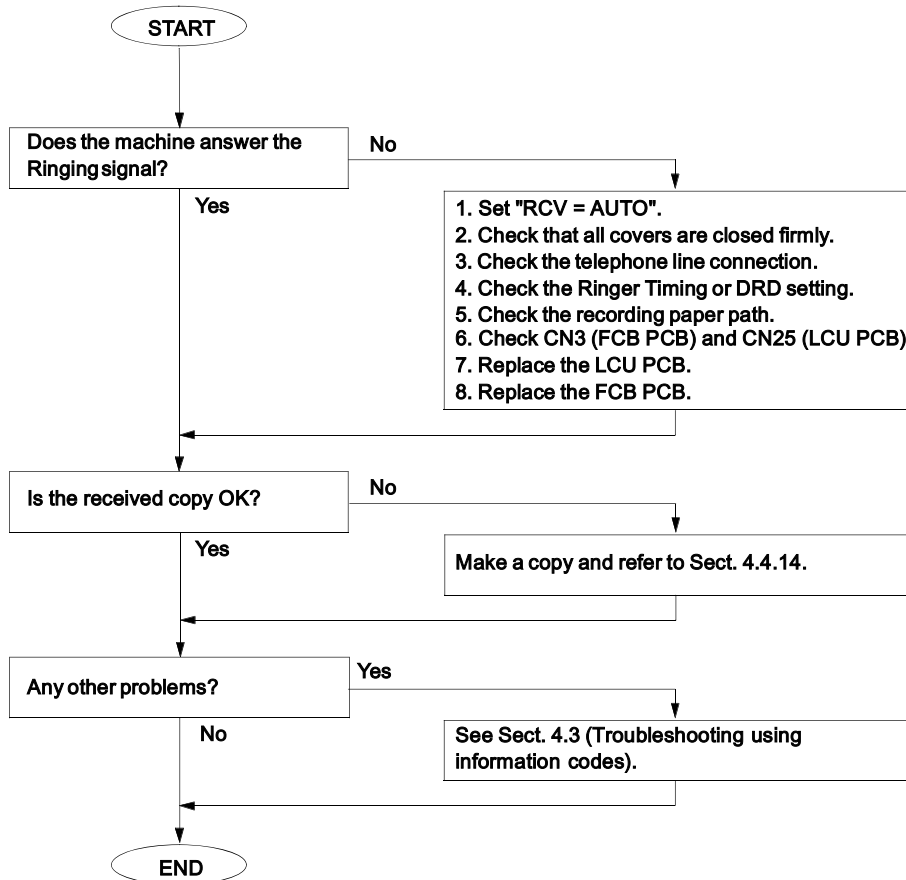
4.6.3. Dialing Problems



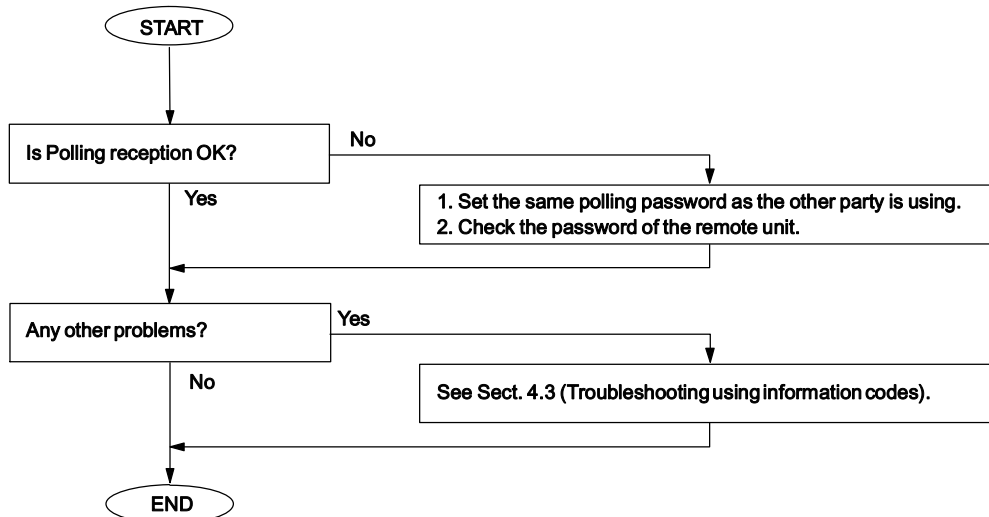
4.6.4. Transmission Problems



4.6.5. Reception Problems



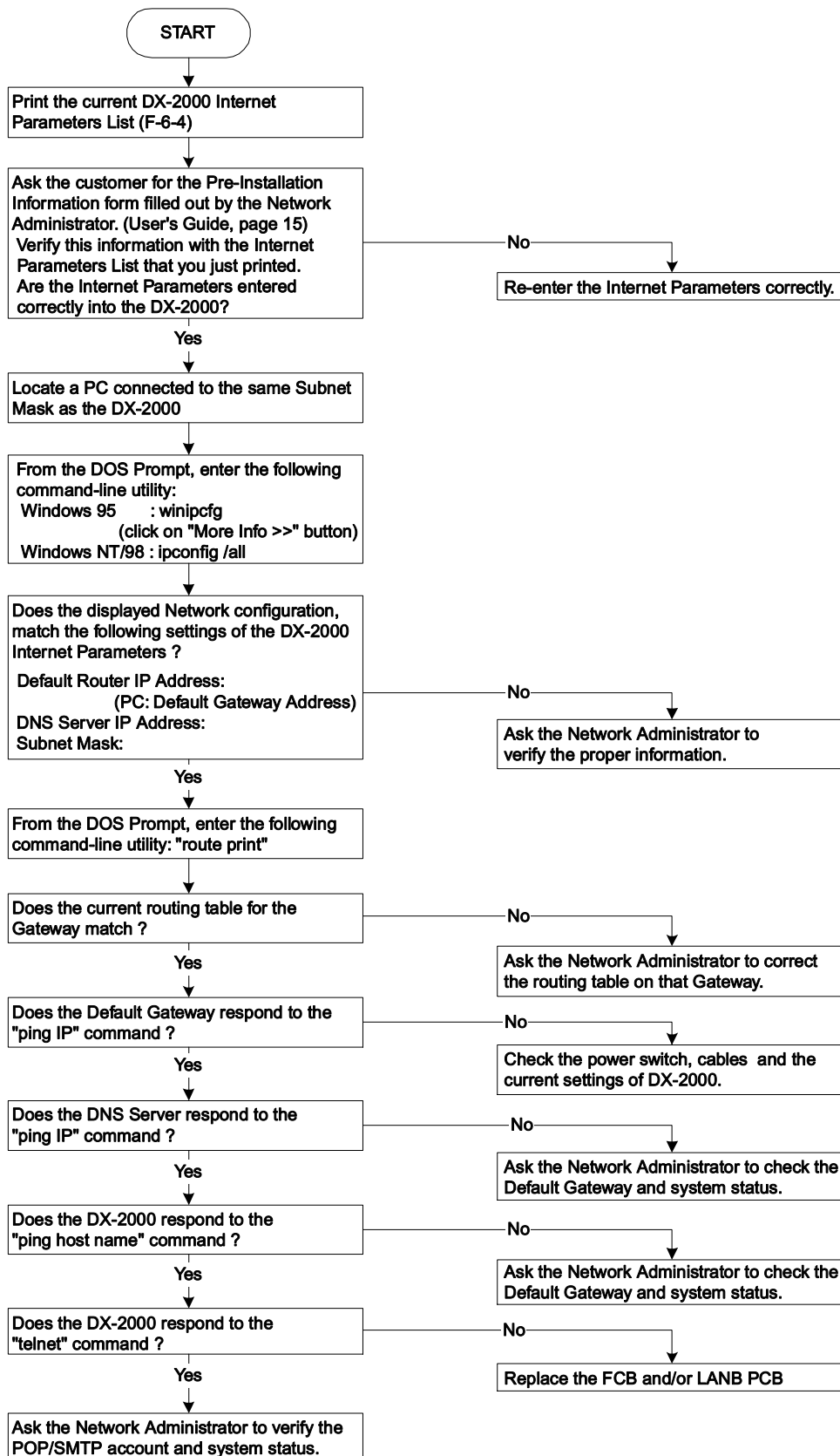
4.6.6. Polling Problems



Note: No-check Mode means that password is not set.

4.7. Troubleshooting the LAN Interface

4.7.1. Checking Network Configuration



4.7.2. Testing the TCP/IP Network

It is beyond the scope of this Service Manual to cover Networking in detail, there are many excellent manuals on this subject, but we hope the information in this section will aid with your troubleshooting efforts. In most cases, the Network Administrator will be able to provide you with needed information or assistance.

When encountering Network problems during an onsite service call or during the installation stage, try to isolate the steps that are not being completed so that you can quickly locate the components that don't work. It is best to organize your troubleshooting efforts by understanding what should be happening, then you can trace the path and see where the problem is occurring.

In our case, we use TCP/IP for transportation of data from one system to another, which involves a whole series of events occurring throughout a number of different layers.

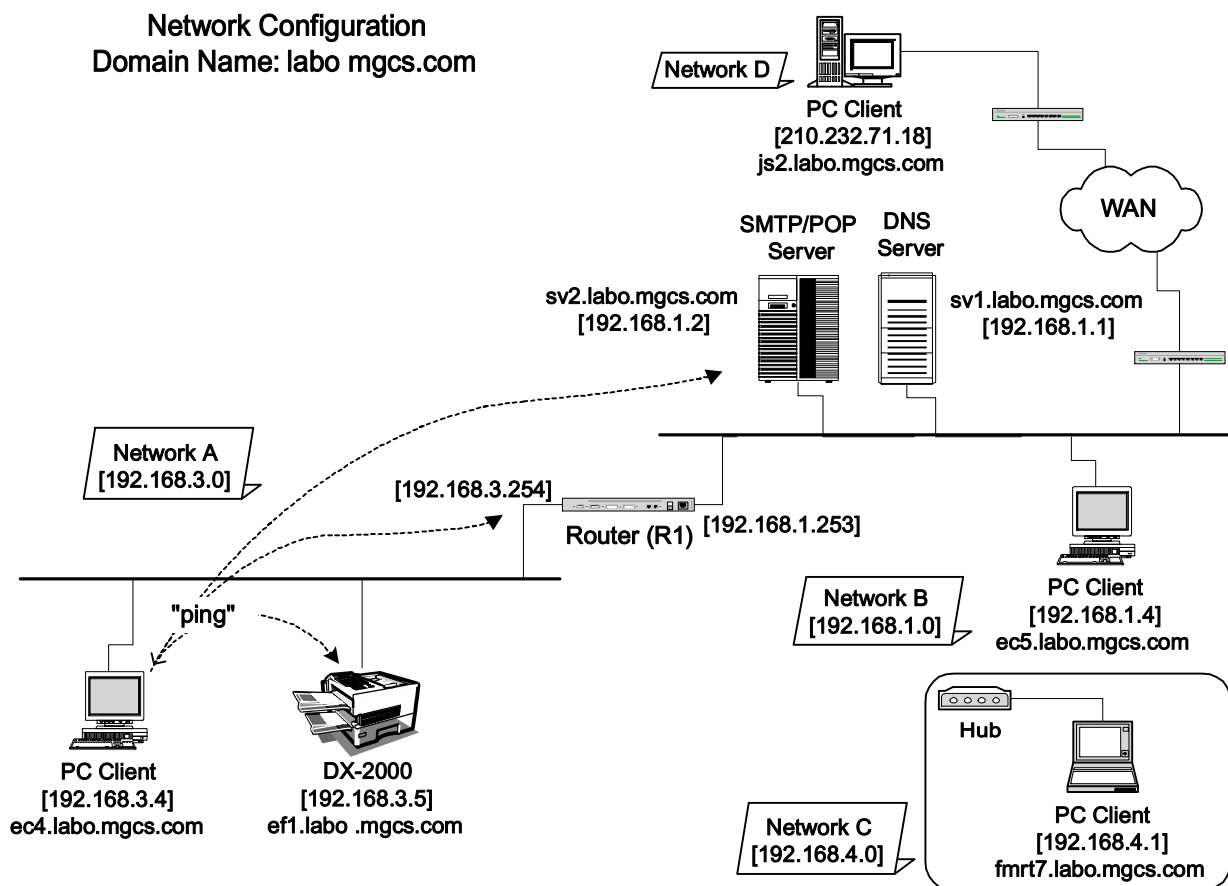
As with all networking, TCP/IP works better when its plugged in, therefore, start your troubleshooting by checking the Physical Connectivity first, the cable(s).

In our examples, we'll use several simple tools readily available in the DOS command-line utility for troubleshooting. There are many other utilities available for checking more detailed information, some are Free of charge, others are available for a nominal fee.

1. System Diagram Model

Ask the customer to provide you with the Pre-Installation Information form, that was filled out by the Network Administrator. (See User's Guide, page 15)

A description or system diagram for the DX-2000, including its physical address, email server and DNS server is required.



2. Checking Current Configuration

Print the current DX-2000 Internet Parameters configuration (F-6-4).

Locate a PC connected to the same Subnet Mask as the DX-2000, then from the DOS Prompt, type the following command-line utility: "**ipconfig /all**" for Windows NT/98 or "**winipcfg**" for Windows 95 (click on "More Info >>" button).

Verify that the displayed Network configuration on the PC, matches the following Internet Parameter settings of the DX-2000:

Default Router IP Address: (PC: Default Gateway Address:)

DNS Server IP Address:

Subnet Mask: (whether it is valid)

For Windows 95

The following example shows the output after you type "winipcfg" at a command prompt:

```
C:\winipcfg

IP Configuration

        Host Name           :      ec4.labo.mgcs.com
        DNS Servers          :      192.168.1.1
        Node Type            :      Broadcast
        NetBIOS Scope ID     :
        IP Routing Enabled   :
        WINS Proxy Enabled   :
        NetBIOS Resolution Uses DNS :      Yes
        Ethernet Adapter Information :
        Adapter Address      :      IBM 100/10 EtherJet PCI Adapter
        IP Address           :      00-04-AC-EE-9C-E8
        Subnet Mask          :      192.168.3.4
        Default Gateway      :      255.255.255.0
        DHCP Server          :      192.168.3.254
        Primary WINS Server   :
        Secondary WINS Server :      210.232.71.18
        Lease Obtained       :      192.168.3.2
        Lease Expires        :
```

For Windows NT / 98

The following example shows the output after you type "ipconfig /all" at a command prompt:

```
C:\>ipconfig /all

Windows NT IP Configuration

Host Name — — — — — : ec4.labo.mgcs.com
DNS Servers — — — — — : 192.168.1.1
Node Type — — — — — : Hybrid
NetBIOS Scope ID — — — — — :
IP Routing Enabled. — — — — — : No
WINS Proxy Enabled — — — — — : No
NetBIOS Resolution Uses DNS — — — — — : No

Ethernet adapter IBMFE1 — — — — — :

Description — — — — — : IBM 100/10 EtherJet PCI Adapter

Physical Address — — — — — : 00-04-AC-EE-9C-E8
DHCP Enabled — — — — — : No
IP Address — — — — — : 192.168.3.4
Subnet Mask — — — — — : 255.255.255.0
Default Gateway — — — — — : 192.168.3.254
Primary WINS Server — — — — — : 192.168.3.18
```

From the above examples, you know the Network configuration for the specified Subnet Mask is as follows: IP Address: 192.168.3.4; Subnet Mask: 255.255.255.0; Default Gateway (Default Router IP Address): 192.168.3.254; DNS Server: 192.168.1.1 and the Domain Name: labo.mgcs.com (obtained from the Host Name).

3. Using "PING" to Test Physical Connectivity

The Packet Internet Groper (PING) is a command-line tool included with every Microsoft TCP/IP client (any DOS or Windows client with the TCP/IP protocol installed). PING is a simple utility that is used to send a test packet to a specified IP Address or Hostname, then, if everything is working properly, the packet is echoed back (returned).

Sample command-line PINGing and parameters are shown below. There are several available options that can be specified with the PING command. However, for our examples, we will use two options (-n and -w) which are commonly used when the response from the destination location is too long.

-n *count* : The number of echo requests that the command should send. The default is four.
-w *timeout* : Specifies the period PING will wait for the reply before deciding that the host is not responding.
PINGing the DX-2000

```
C:\WINDOWS>ping ef1.labo.mgcs.com

Pinging ef1.labo.mgcs.com [192.168.3.5] with 32 bytes of data:

Reply from 192.168.3.5: bytes=32 time=5ms TTL=253
Reply from 192.168.3.5: bytes=32 time=4ms TTL=253
Reply from 192.168.3.5: bytes=32 time=4ms TTL=253
Reply from 192.168.3.5: bytes=32 time=4ms TTL=253
```

PINGing the Default Gateway (Default Router IP Address)

```
C:\WINDOWS>ping 192.168.3.254

Pinging 192.168.3.254 with 32 bytes of data:

Reply from 192.168.3.254: bytes=32 time=5ms TTL=253
Reply from 192.168.3.254: bytes=32 time=4ms TTL=253
Reply from 192.168.3.254: bytes=32 time=4ms TTL=253
Reply from 192.168.3.254: bytes=32 time=4ms TTL=253
```

PINGing the SMTP/POP Server

```
C:\WINDOWS>ping sv2.labo.mgcs.com

Pinging sv2.labo.mgcs.com [192.168.1.2] with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=5ms TTL=253
Reply from 192.168.1.2: bytes=32 time=5ms TTL=253
Reply from 192.168.1.2: bytes=32 time=5ms TTL=253
Reply from 192.168.1.2: bytes=32 time=5ms TTL=253
```

If for some reason, the physical connection is missing, the echo reply will not be received from the destination and the following output is displayed:

```
C:\WINDOWS>ping fmrt7.labo.mgcs.com

Pinging fmrt7.labo.mgcs.com [192.168.4.1] with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.4.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

If the physical destination is far and it's connected by WAN (Wide Area Network), the PING option command default value must be changed to compensate for the expected delayed response.

e.g. -n 10: Number of echo requests that the command should send.

-w 2000: Specifies the period PING will wait for the reply before deciding that the host is not responding.

```
C:\WINDOWS>ping js2.labo.mgcs.com -n 10 -w 2000

Pinging js2.labo.mgcs.com [210.232.71.18] with 32 bytes of data:

Reply from 210.232.71.18: bytes=32 time=633ms TTL=252
Reply from 210.232.71.18: bytes=32 time=645ms TTL=252
Reply from 210.232.71.18: bytes=32 time=810ms TTL=252
Reply from 210.232.71.18: bytes=32 time=455ms TTL=252
Reply from 210.232.71.18: bytes=32 time=645ms TTL=252
Reply from 210.232.71.18: bytes=32 time=633ms TTL=252
Reply from 210.232.71.18: bytes=32 time=677ms TTL=252
Reply from 210.232.71.18: bytes=32 time=703ms TTL=252
Reply from 210.232.71.18: bytes=32 time=633ms TTL=252
Reply from 210.232.71.18: bytes=32 time=633ms TTL=252
```

4. Tracing a Packet Route

Another useful command-line utility is TRACERT, which is used to verify the route a packet takes to reach its destination. The result shows each router crossed and how long it took to get through each particular router to reach the specified destination. The time it takes to get through a particular router is calculated three times and displayed for each router hop along with the IP Address of each router crossed. If a FQDN (Fully Qualified Domain Name) is available, it will be displayed as well.

This utility is useful for two diagnostic purposes:

- a. To detect whether a particular router is malfunctioning along a known path. For example, if you know that packets on a network always go through London to get from New York to Berlin, but the communication is failing. A TRACERT to the Berlin address shows all the hops up to the point where the router in London should respond. If it does not respond, the time values are shown with an asterisk (*), indicating the packet timed out.
- b. To determine whether a router is slow and needs to be upgraded or additional routers should be installed on the network. You can determine this by simply comparing the time it takes for a packet to get through a particular router. If its return time is significantly higher than the other routers, it should be upgraded.

To use this utility, from the DOS command-line, type: `tracert <IP Address or Hostname>`

Tracing the Route to SMTP/POP Server

```
C:\WINDOWS>tracert sv2.labo.mgcs.com
Tracing route to sv2.labo.mgcs.com [192.168.1.2]
over a maximum of 30 hops:

  1  4 ms  2 ms  2 ms  192.168.3.254
  2  4 ms  5 ms  5 ms  sv2.labo.mgcs.com [192.168.1.2]

Trace complete.
```

5. Managing Network Route Tables

In the simplest case a router connects two network segments (see System Diagram Model on page 153). In this model, the system used to join the two segments needs to know only about these segments.

The routing table for router R1 in this case is simple; the following table shows its key routes:

Network Address	Netmask	Gateway	Interface
192.168.3.0	255.255.255.0	192.168.3.254	192.168.3.254
192.168.1.0	255.255.255.0	192.168.1.253	192.168.1.253

When the DX-2000 at 192.168.3.5 attempts to communicate with the DX-2000 at 192.168.1.x, IP performs the AND'ing process to find two things: The local network ID is 192.168.3.0, and the destination network ID is not. This means, that the destination host is not on the local network.

IP, is responsible to find a route to the remote network, and therefore, it consults the routing table. Here, the local host normally determines that the next step in the route is the Default Gateway, and sends the packet to router R1.

The router R1, receives the packet. After determining that the packet is for another host and not the router itself, it checks the routing table. It finds the route to 192.168.1.0 and sends the packet through the interface to the DX-2000 at 192.168.1.x, which receives the packet. This is a simple route that took only a single hop.

When another network is added as the number of hosts grows, it gets complicated, and the systems on the most distant networks cannot communicate. When the router receives a packet in this case, it cannot find a route to the remote network. It then discards the packet and a message indicating "destination host unreachable" is sent to the originator.

Here, is where the ROUTE command-line utility is useful when dealing with more than two networks, and is used by Administrators to statically manage a route table by adding, deleting, changing and clearing the route table. It has a number of options that are used to manipulate the routing tables, some are shown below:

- **MASK**

If this switch is present, the next parameter is interpreted as the netmask parameter.

- **Netmask**

If included, specifies a sub-net mask value to be associated with this route entry. If not specified, it defaults to 255.255.255.255.

- **Gateway**

Specifies the gateway.

- **METRIC**

Specifies the metric / cost for the destination.

All symbolic names used for the destination are looked up in the network database file NETWORKS.

The symbolic names for the gateway are looked up the host name database file HOSTS.

When the packet does not reach the specified destination even when the physical connection is properly made, check the registered persistent routes on the same subnet as the DX-2000 by typing "route print" in the DOS command-line. The output display is shown below:

```
C:\WINDOWS>route print
Active Routes:

Network Address      Netmask            Gateway Address    Interface          Metric
0.0.0.0              0.0.0.0            192.168.3.254     192.168.3.2        1
127.0.0.0            255.0.0.0          127.0.0.1         127.0.0.1          1
192.168.3.0          255.255.255.0      192.168.3.2       192.168.3.2        1
192.168.3.2          255.255.255.255    127.0.0.1         127.0.0.1          1
192.168.3.255        255.255.255.255    192.168.3.2       192.168.3.2        1
224.0.0.0            224.0.0.0          192.168.3.2       192.168.3.2        1
255.255.255.255      255.255.255.255    192.168.3.2       192.168.3.2        1
```

6. Host Name Query on DNS Server

Windows NT 4.0 also has a tool that enables you to test DNS to verify that it is working properly. This utility is not available on Windows 95 /98.

From the DOS command-line, type "NSLOOKUP" to display the following output:

```
C:\>nslookup
Default Server: sv1.labo.mgcs.com
Address: 192.168.1.1
```

NS(Name Server) record in Domain

From the DOS command-line, type "Is -t NS <Domain Name>" to display the following output:

```
> Is -t NS labo.mgcs.com.
[sv1.labo.mgcs.com.]
labo.mgcs.com.      NS  server = sv1.labo.mgcs.com
```

MX(Mail Exchange) record in Domain

From the DOS command-line, type "Is -t MX <Domain Name>" to display the following output:

```
> Is -t MX labo.mgcs.com
[sv1.labo.mgcs.com.]
labo.mgcs.com.      MX  10  sv2.labo.mgcs.com
```

A (Address) record in Domain

From the DOS command-line, type "ls -t A <Domain Name>" to display the following output:

```
> ls -t A labo.mgcs.com
[sv1.labo.mgcs.com]
labo.mgcs.com.      NS  server = sv1.labo.mgcs.com
sv1                 A   192.168.1.1
sv2                 A   192.168.1.2
ec5                 A   192.168.1.4
ec4                 A   192.168.3.4
ef1                 A   192.168.3.5
```

(To leave from this menu, type "exit" on the command-line)

7. Testing DX-2000 Using the TELNET Command

TELNET is a terminal emulation protocol. TELNET enables PCs and workstations to function as dumb terminals in sessions with hosts on internetworks.

From Windows 95/98/NT, use the TELNET to test the communication of TCP/IP and SMTP Protocol manually to the DX-2000. This method eliminates the SMTP Server.

For better understanding, type "telnet" in the DOS Command-line to bring up the Telnet screen. Then, click on the Terminal menu and on Preferences, check the "Local Echo" and "Block Cursor" radio dials and click on the OK button.

Click on the Connect menu, then click on Remote System...

Enter "25" in the "Port:" field and click on Connect button.

For example,

```
C:\WINDOWS>telnet

telnet to ef1.labo.mgcs.com[192.168.3.5]
220 ef1.labo.mgcs.com DX2000 V.xx
helo
250 Hello

mail from:test
250 Sender OK

rcpt to:fax@labo.mgcs.com
250 Receiptient OK

data
354 Email, end with "CRLF . CR LF"

[Press the Enter Key]
Panasonic Internet Fax
test
[Press the Enter Key]
[Press the Enter Key]
[Press the Enter Key]
250 OK, Mail accept

quit
221 Closing transaction channel
```

4.7.3. SMTP Server Reply Codes

The Simple Mail Transfer Protocol (SMTP) is independent of the particular transmission subsystem and requires only a reliable ordered data stream channel. The SMTP design is based on the following model of communication:

- As a result of a user mail request, the sender-SMTP establishes a two-way transmission channel to a receiver-SMTP.
- The receiver-SMTP may be either the ultimate or an intermediate destination.
- The SMTP commands generated by the sender-SMTP are sent to the receiver-SMTP.
- In response to commands, the SMTP replies are sent from the receiver-SMTP to the sender-SMTP.

SMTP Reply Codes

- 211 System status or system help reply
- 220 <domain> Service ready
- 221 <domain> Service closing transmission channel
- 250 Requested mail action okay, completed
- 251 User not local; will forward to <forward-path>
- 354 Start mail input; end with <CRLF>.<CRLF>
- 421 <domain> Service not available, closing transmission channel
[This may be a reply to any command if the service knows it must shut down]
- 450 Requested mail action not taken: mailbox unavailable
[i.e., mailbox busy]
- 451 Requested action aborted: local error in processing
- 452 Requested action not taken: insufficient system storage
- 500 Syntax error, command unrecognized
[This may include errors such as command line is too long]
- 501 Syntax error in parameters or arguments
- 502 Command not implemented
- 503 Bad sequence of commands
- 504 Command parameter not implemented
- 550 Requested action not taken: mailbox unavailable
[i.e., mailbox not found, no access]
- 551 User not local; please try <forward-path>
- 552 Requested mail action aborted: exceeded storage allocation
- 553 Requested action not taken: mailbox name not allowed
[i.e., mailbox syntax incorrect]
- 554 Transaction failed

4.7.4. POP 3 (RFC1939)

1. Basic Operation

Initially, the server host starts the POP3 service by listening on TCP port 110. When a client host wishes to make use of the service, it establishes a TCP connection with the server host. When the connection is established, the POP3 server sends a greeting. The client and POP3 server then exchange commands and responses (respectively) until the connection is closed or aborted.

Commands in the POP3 consist of a case-insensitive keyword, possibly followed by one or more arguments. All commands are terminated by a CRLF pair. Keywords and arguments consist of printable ASCII characters. Keywords and arguments are each separated by a single SPACE character. Keywords are three or four characters long. Each argument may be up to 40 characters long.

POP3 responses consist of a status indicator and a keyword possibly followed by additional information. All responses are terminated by a CRLF pair. Responses may be up to 512 characters long, including the terminating CRLF. There are currently two status indicators: positive ("OK") and negative ("-ERR"). Servers MUST send the "+OK" and "-ERR" in upper case.

Responses to certain commands are multi-line. In these cases, which are clearly indicated below, after sending the first line of the response and a CRLF, any additional lines are sent, each terminated by a CRLF pair. When all lines of the response have been sent, a final line is sent, consisting of a termination octet (decimal code 046, ".") and a CRLF pair. If any line of a multi-line response begins with the termination octet, the line is "byte-stuffed" by pre-pending the termination octet to that line of the response.

Hence a multi-line response is terminated with the five octets "CRLF.CRLF". When examining a multi-line response, the client checks to see if the line begins with the termination octet. If so and if octets other than CRLF follow, the first octet of the line (the termination octet) is stripped away. If so and if CRLF immediately follows the termination character, then the response from the POP server is ended and the line containing ".CRLF" is not considered part of the multi-line response.

A POP3 session progresses through a number of states during its lifetime. Once the TCP connection has been opened and the POP3 server has sent the greeting, the session enters the AUTHORIZATION state. In this state, the client must identify itself to the POP3 server. Once the client has successfully done this, the server acquires resources associated with the client's maildrop, and the session enters the TRANSACTION state. In this state, the client requests actions on the part of the POP3 server. When the client has issued the QUIT command, the session enters the UPDATE state. In this state, the POP3 server releases any resources acquired during the TRANSACTION state and says goodbye. The TCP connection is then closed.

A server MUST respond to an unrecognized, unimplemented, or syntactically invalid command by responding with a negative status indicator. A server MUST respond to a command issued when the session is in an incorrect state by responding with a negative status indicator. There is no general method for a client to distinguish between a server which does not implement an optional command and a server which is unwilling or unable to process the command.

A POP3 server MAY have an inactivity autologout timer. Such a timer MUST be of at least 10 minutes' duration. The receipt of any command from the client during that interval should suffice to reset the autologout timer. When the timer expires, the session does NOT enter the UPDATE state—the server should close the TCP connection without removing any messages or sending any response to the client.

2. POP3 Command Summary

Minimal POP3 Commands:

USER name valid in the AUTHORIZATION state
PASS string
QUIT

STAT valid in the TRANSACTION state
LIST [msg]
RETR msg
DELE msg
NOOP
RSET
QUIT

Optional POP3 Commands:

APOP name digest valid in the AUTHORIZATION state

TOP msg n valid in the TRANSACTION state
UIDL [msg]

POP3 Replies:

+OK
-ERR

Note that with the exception of the STAT, LIST, and UIDL commands, the reply given by the POP3 server to any command is significant only to "+OK" and "-ERR". The client may ignore any text occurring after this reply.

4.7.5 Troubleshooting with Information Codes

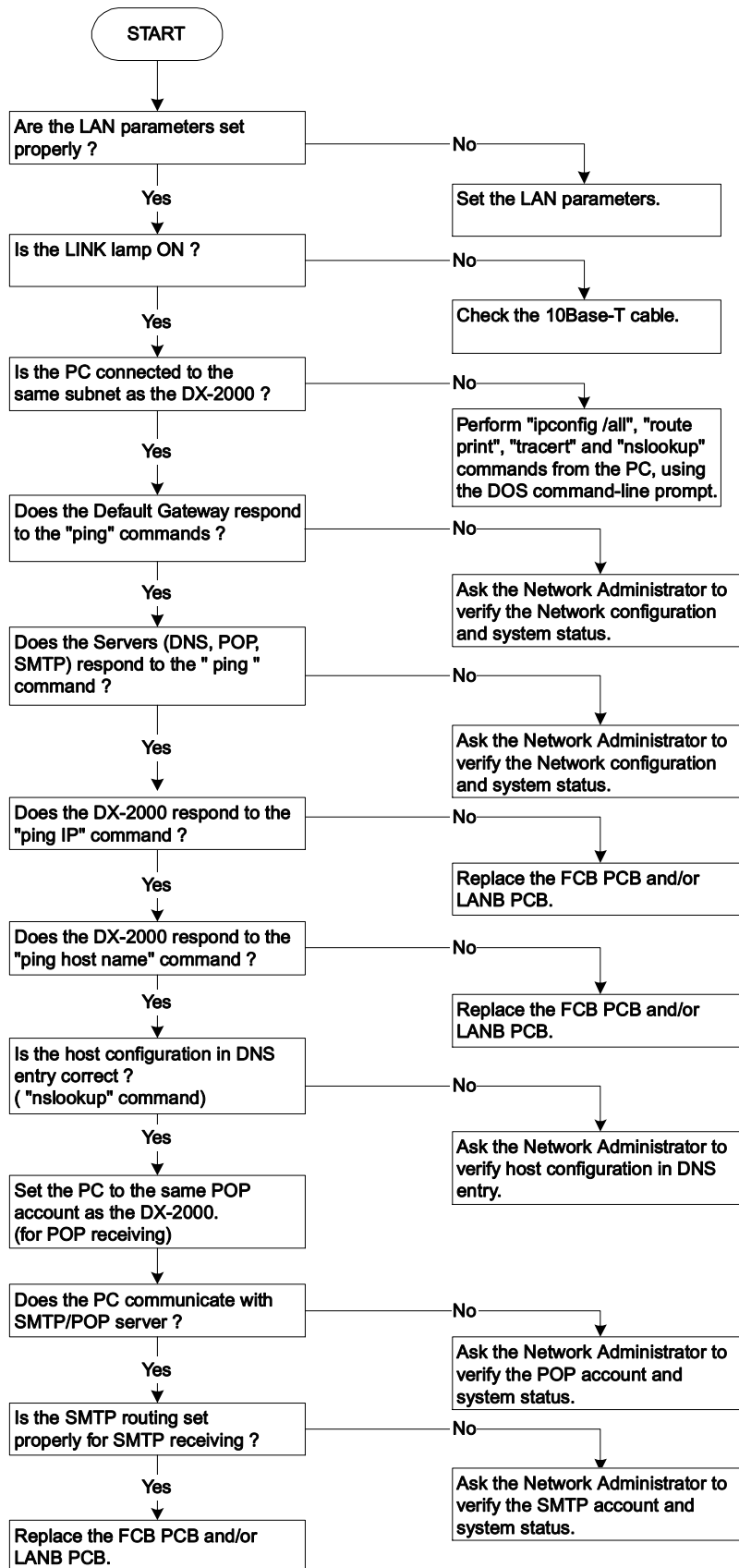
The displayed 3-digit information codes, show the unit's status. These codes are also printed on the journal. The following table indicates the appropriate sections for troubleshooting.

Information Codes (SMTP INFO. CODES)			
Code	Mode	Explanation	Timer/SMTP Reply Code
710	XMT/RCV	Command response between LANC/LANB PCB timed out	While the TCP connection was open
712	XMT	Unknown email address replied from the Mail Server	SMTP Command Reply to "RCPT TO:"
713	XMT/RCV	Memory overflow in the LAN Interface. (Document data exceeded 1.6 Mbyte/page and cannot be sent)	Data Block
714	XMT	LAN Interface error. Cannot logon to the LAN Timeout (no reply from the mail server), 3 min	Data Block
715	XMT	TCP/IP connection timed out, 3 min	Data Block
716	XMT	Cannot logon to the LAN (Connection error, 4 min)	TCP 3 way Handshake
717	XMT/RCV	Incomplete SMTP protocol transmission	Data Block
719	RCV	Received data via LAN is in a format that is not supported (non-TIFF file)	After the TCP connection was closed
725	XMT	DNS Server connection timed out	Opening session
726	XMT	Protocol error, received an error response from the DNS Server	Opening session
730	RCV	Fax protocol error, unable to program the Internet Parameters or the Autodialer with Email from a PC	- - -
731	RCV	Fax protocol error. Dialer full while Relayed Transmission Request was received	- - -
870	RCV	Fax memory overflow occurred while storing documents into memory	SMTP Command Reply

Information Codes (POP3 INFO. CODES)		
Code	Explanation	State
710	Command response between LANC/LANB PCB timed out	While the TCP connection was open
713	Memory overflow in the LAN Interface. (Document data exceeded 1.6 Mbyte/page and cannot be sent)	Transaction
714	LAN Interface error. Cannot logon to the LAN Timeout (no reply from the mail server), 3 min	Transaction
715	TCP/IP connection timed out, 3 min	Transaction
717	Incomplete POP3 protocol transmission	Transaction
719	Received data via LAN is in a format that is not supported (non-TIFF file)	Update
720	Unable to connect with the POP Server. Protocol error (incorrect POP Server address)	Authorization
721	Unable to login to the POP Server. Protocol error (incorrect User Name or Password is set)	Authorization
725	DNS Server connection timed out	Opening session
726	Protocol error, received an error response from the DNS Server	Opening session
730	Fax protocol error, unable to program the Internet Parameters or the Autodialer with Email from a PC	Transaction
731	Fax protocol error. Dialer full while Relayed Transmission Request was received	Transaction
870	Fax memory overflow occurred while storing documents into memory	Transaction

4.7.5.1. Info. Codes: 710, 712, 714, 715, 716, 717, 720, 721, 725 and 726 (Troubleshooting Internet Communication Problems)

Troubleshooting with Information Codes



4.8. Information Code Table

Information Codes				
Code	Mode	Phase	Description of Problem	Cause
001	RCV COPY	C, D	Leading edge of the recording paper fails to reach the Timing Sensor. (1st cassette)	Recording paper jam. Timing Sensor abnormal.
002	RCV COPY	C, D	Leading edge of the recording paper fails to reach the Timing Sensor. (2nd cassette)	Recording paper jam. Timing Sensor abnormal.
003	RCV COPY	C, D	Leading edge of the recording paper fails to reach the Timing Sensor. (3rd cassette)	Recording paper jam. Timing Sensor abnormal.
007	RCV COPY	C, D	1. Leading edge of the recording paper fails to reach the Eject Sensor. 2. Recording paper has not completely passed the Eject Sensor.	Recording paper jam. Eject Sensor abnormal.
008	RCV COPY	C, D	Paper Cassette was opened while the recording paper was feeding.	Recording paper jam.
010	RCV COPY	B, C	No recording paper.	No recording paper or paper is not set properly. No paper Sensor is defective.
011	STANDBY	-	Paper Cassette is not installed properly.	
012	RCV	C, D	The length of the received document is over 380 mm. (Used in France only)	
021	STANDBY RX COPY	B, C, D	Fan is abnormal. Thermister is abnormal. Fuser Control is abnormal.	Defective LPC PCB. Defective Fuser Unit, LVPS or Fan.
026	-	-	The backup battery is getting weak.	
030	XMT	B	Read Point Sensor does not go ON within 10 seconds after the document starts feeding.	Document is not set properly. Defective Read Point Sensor.
031	XMT COPY	C	Transmitting document was longer than 2,000 mm (or 78.7 in).	The document may jam. Defective Read Point Sensor.
033	-	-	Sub CPU system error.	Defective FCB PCB.
041	STANDBY RX COPY	B, C, D	Out of toner.	No toner. Defective Toner Sensor.
043	STANDBY RX COPY	B, C, D	Low Toner.	Toner is getting low. Defective Toner Sensor.
045	STANDBY	-	No Toner Cartridge.	Toner cartridge has not been installed. Defective Toner Sensor (Cartridge Sensor).
051	RCV COPY	-	Printer Motor is abnormal.	Connector not properly connected. Defective Printer Motor. Defective LPC PCB.
054	STANDBY RX COPY	-	HSYNC is abnormal. Laser motor is abnormal.	Defective Laser Unit.
055	STANDBY RX COPY	-	No response of LBP CPU on LPC.	Defective LPC PCB. Defective FCB PCB.
058	-	A	Interface error occurred with the 500-sheet optional cassette feeder.	Defective CST3 PCB.
059	RCV COPY	C	Interface error occurred between FCB PCB and LPC PCB.	Defective LPC PCB. Defective FCB PCB.
060	-	A	Printer Cover is open.	Cover is not firmly closed. Connectors are not firmly connected.
061	-	A	ADF Door is open.	Cover is not firmly closed. Connectors are not firmly connected.
063	-	A	Jam Access Cover is open.	Cover on the optional 2nd cassette is not closed.
064	-	A	Jam Access Cover is open.	Cover on the optional 3rd cassette is not closed.
200	RCV	C	Decoding process is not completed at the end of phase C.	Defective FCB PCB.
212	XMT RCV	A-E	Interface error occurred between the CPU and modem.	Modem is defective. (FCB PCB) Software problem occurred. (FCB PCB)
301	XMT RCV	-	System fault.	Software problem occurred. (FCB PCB)
331	XMT	C	8-minutes timer error. (Germany only)	

Information Codes				
Code	Mode	Phase	Description of Problem	Cause
400	XMT	B	T1 timer (35±5 sec) elapsed without detecting 300 bps signal.	Wrong number is dialed and the START button is pushed. Telephone line is disconnected while dialing. FCB PCB (Modem) or LCU PCB is defective. Receiver is defective. (It may only be transmitting CED)
401	XMT	B	DCN was returned from receiver while transmitter is waiting for CFR or FTT.	Your machine's ID Number is not programmed. Possible incompatibility or incorrect Password (Password Reception, Selective Receive). Mailbox is full.
402	XMT	B	DCN was returned from receiver while transmitter is waiting for NSF/DIS.	Receiver working in non-CCITT mode only. (Possible incompatibility)
403	RCV(Polling)	B	Transmitter had no polling function.	"POLLED=ON" (polling XMT ready) is not set at the transmitter. Document to be transmitted is not placed at the transmitter.
404	XMT	B	Transmitter sent NSS (or DCS) followed by TCF three times, but the receiver did not respond. (CFR or FTT is usually returned)	Receiver is defective. (Modem, LCU PCB, etc.) FCB PCB or LCU PCB is defective. Receiver disconnects line during first NSS (or DCS) is transmitted.
405	XMT	B	Transmitter received FTT after it transmitted TCF at 2400 bps. Received RTN after communicating at 2400 bps.	Line quality is poor. (TCF is damaged due to line noise) Receiver is defective. (Modem, LCU PCB, etc.) FCB PCB or LCU PCB is defective.
406	RCV(Pass-word Comm.)	B	XMT-Password mismatched. RCV-Password mismatched. Selective RCV incomplete.	XMT, RCV password does not match. Last 4 digits of TSI does not match with the last 4 digits of ONE-TOUCH, ABBR telephone number.
407	XMT	D	Transmitter received no response after it transmitted post message, such as EOP, MPS, EOM, etc...or received DCN.	Receiver is defective. (No paper, paper jamming, etc.) Receiver ceased receiving because of excessive error. (Line quality is poor) FCB PCB (Modem) or LCU PCB is defective.
408	XMT	D	Transmitter received RTN after it transmitted EOP, MPS, or EOM.	Receiver receives data with error. (Line quality is poor) Receiver is defective. (Modem, LCU, etc.) FCB PCB or LCU PCB are defective.
409	XMT	D	Transmitter receives PIN after it transmitted a post message, such as EOP, MPS, EOM, etc.	Receiver receives data with error due to poor line quality, and receiving operator requests voice contact. Receiver is defective. (Modem, LCU, etc.) FCB PCB or LCU PCB are defective.
410	RCV	D	Received DCN while waiting for post command. (EOP, MPS, EOM, etc.)	Interface or line is faulty. Transmitter is defective.
411	RCV(Polling)	B	Received DCN after transmitting NSC.	Transmitter is not ready for polling communication. Password does not match between transmitter and receiver.
412	G3 RX	B, D	No response within 12 seconds in NSS/DCS/ MPS wait state. (After transmitting FTT)	Transmitter is defective. FCB PCB is defective.
414	RCV(Polling)	B	No response received after transmitting 3rd NSC.	Password does not match between transmitter and receiver. Transmitter is defective. (No document, document jam, etc.)
415	XMT(Polling)	B	Remote side attempted to receive message from your machine in polling communication. Inform the remote side that your machine does not have the polling transmission feature.	
416	RCV	D	Receiver did not detect post command, such as EOP, MPS, EOM, etc.	Transmitter is defective. Line quality is poor. (RTC signal is distorted due to line noise) FCB PCB or LCU PCB are defective.
417	RCV	C	Receiver returned RTN in response to post message.	Line quality is poor. (There are excessive errors in received data) FCB PCB or LCU PCB are defective.

Information Codes				
Code	Mode	Phase	Description of Problem	Cause
418	RCV	C	Receiver transmitted PIN in response to PRI-Q from transmitter. (Transmitting operator requests voice contact)	Line quality is poor. (There are excessive errors in received data) FCB PCB or LCU PCB are defective.
420	RCV	B	T1 timer (35 sec.) elapsed without detecting 300 bps signal.	Incorrect type of incoming call.(non-facsimile communication) Transmitter is defective. FCB PCB or LCU PCB is defective.
421	RCV	B	Busy Tone is detected after sending NSF Signal.	Remote station disconnects the line. Wrong number is dialed.
422	XMT	B	Content of NSF (or DIS) or NSC (or DTC) was invalid.	There is an incompatibility.
427	G3 RCV	B	DCN received to NSF/CSI/DIS transmitted.	The interface is incompatible.
433	XMT RCV	B, D	T.30 Protocol abnormal.	Defective remote station.
434	XMT or RCV	B	CD (response from Modem) did not turn OFF within 180 sec. after receiver detected FLAG signal.	Remote unit is defective. FCB PCB or LCU PCB is defective.
436	G3 RX	C	DCN received after transmitting FTT.	Transmitter is defective or incompatible. Line quality is poor.
456	RCV	B	Received relay transfer request or confidential document to distribute to a end receiving station or all confidential mailboxes are used.	
457	RELAYXMT CONF.XMT/ POLL	B	Remote unit does not have Relayed XMT or Confidential Comm. capability.	
459	RCV	C	Failed training in Phase C.	Line quality is poor. (Training signal is distorted due to line noise) FCB PCB or LCU PCB are defective.
490	RCV	C	Sum of error line exceeded the limit (Parameter 70) by 64 lines.	Line quality is poor. FCB PCB or LCU PCB are defective.
494	RCV	C	Interval between two EOLs was more than 10 sec. when receiver received message data.	Transmitter is defective. Line quality is poor. (EOL is damaged due to line noise) FCB PCB or LCU PCB are defective.
495	XMT/RCV	C	During reception, CD turned OFF or continued ON for long time. During communication, lost loop - current.	Line is disconnected. Transmitter is defective. FCB PCB or LCU PCB are defective.
496	XMT	C	CS of modem is not able to turn ON.	FCB PCB is defective.
501	XMT/ RCV(V.34)	B	Remote unit's Modem is not compatible.	
502	XMT/ RCV(V.34)	B, C, D	During reception, CD turned OFF or continued ON for long time. During communication, lost loop - current.	Line is disconnected. Transmitter is defective. FCB PCB or LCU PCB are defective.
503	XMT/ RCV(V.34)	B, C, D	CS of modem is not able to turn ON during training.	FCB PCB is defective. Line is disconnected.
504	RCV/V.34 (Polling)	B	Polling is rejected from the remote station.	No polling document is set.
505	XMT/V.34 (Polling)	B	Polling XMT is rejected.	No polling document is set.
540	XMT ECM	B	No response after transmitting 3rd CTC or DCN received.	Incompatible interface.
541	XMT ECM	D	No response after transmitting 3rd EOR or received DCN.	Line is faulty. LCU PCB abnormal.
542	XMT ECM	D	No response to the 3rd RR transmitted or received DCN.	Remote unit is abnormal.
543	XMT ECM	D	T5 timer (60 sec.) elapsed without MCF.	Remote unit is abnormal.
544	XMT ECM	D	Stopped Transmission after EOR Transmission.	Line is faulty. LCU PCB abnormal.
550	RCV ECM	C	Timer between frames in phase C has elapsed.	Defective remote station.
554	RCV ECM	D	Transmitted ERR after receiving EOR.	Faulty line.
555	RCV ECM	D	Transmitted PIN after receiving EOR.	Faulty line and Operator Call requested by RX side.
570	RCV	B	Password or machine code did not match during remote diagnostic communication.	
571	XMT	B	Remote unit did not have the remote diagnostic function.	
580	XMT	B	Sub-address transmission to a unit that has their DIS bit 49 (NSF bit 155) OFF.	Sub-address transmission to a unit that has no Sub-address function.

Information Codes				
Code	Mode	Phase	Description of Problem	Cause
581	XMT	B	Sub-address Password transmission to a unit that has their DIS bit 50 (NSF bit 156) OFF.	Sub-address transmission to a unit that has no Sub-address function.
601	XMT	-	ADF Door was opened during ADF transmission.	
623	XMT	A	No document was in the ADF. (Built-in dialer engaged)	Operator removed the document from the ADF after dialing was completed. Document is not set properly in the ADF.
630	XMT or RCV(Polling)	B	Redial count over.	No dial tone detected. Sensor dial tone is not detected. (country dependent) Busy tone is detected. (country dependent) T1 timer (35±5 sec) elapsed without a signal from the receiver.
631	XMT	A	"STOP" button was pressed during Auto Dialing.	
634	XMT	-	Redial count over with no response or busy tone was not detected. Note: U.S.A. models will redial only once if busy tone is not detected. Canadian models will not redial when the communication fails due to no response from the called station.	
638	XMT	-	Power turned off with applicable data in memory or during communication.	Power switched off. Power failure occurred.
710	XMT RCV	LAN	Command Response between LANC/LANB PCB timed out.	Defective LANC/LANB PCB.
712	XMT	LAN	Unknown email address replied from the Mail Server.	Mail Server received an incorrect email address. (Dependent on Server's Mail application)
713	XMT	LAN	Memory overflow in the LAN Interface.	The document data exceeded 1.6 Mbyte/page and cannot be sent.
714	XMT RCV	LAN	LAN interface error. Cannot logon to the LAN.	The 10Base-T cable is not connected. An unexpected LAN problem occurred. Check the LANC/LANB PCB connector.
715	XMT	LAN	TCP/IP connection timed out.	Incorrect IP Address is set. Verify the IP Address, Default Router IP Address, SMTP Server IP Address.
716	XMT	LAN	Cannot logon to the LAN.	Incorrect SMTP Server IP Address is set. No email application is activated on the Mail Server.
717	XMT	LAN	Incomplete SMTP Protocol transmission.	Mail Server's hard disk may be full. Mail Server is defective.
718	XMT	LAN	Page Memory Overflow occurred while receiving printing data. The paper size selected within your application to print is larger than the paper size loaded in the cassette(s).	Check the document size and resolution. Ask originator to re-send in a supported size and resolution.
719	RCV	LAN	Received data via LAN is in a format that is not supported.	Ask the originator to re-send with a supported file attachment: *In a TIFF-F format. *Image data conforming to A4/Letter size.
720	POP	LAN	Unable to connect with the POP Server.	Incorrect POP Server address is set. POP Server is down.
721	POP	LAN	Unable to login to the POP Server.	Incorrect User Name or Password is set.
725	XMT POP	LAN	DNS Server connection timed out.	Incorrect DNS Server address is set. DNS Server is down.
726	XMT POP	LAN	Received an error response from the DNS Server.	Incorrect POP Server address is set. Incorrect SMTP Server address is set.
730	RCV	LAN	Unable to program the Internet parameters or the autodialer with Email from a PC.	Verify that the Fax Parameter #158 is set to 2: Valid.
731	RCV	LAN	Dialer full while Relayed Transmission Request was received.	Dial buffer for manual number dialing (70 stations) are being used.
800	Relay Comm.	-	The machine was requested to relay a document but has no Relay Hub capability.	
814	Conf. XMT Conf. Polling Relay Comm.		The remote station does not have Relay XMT nor Confidential Communication capability.	
815	Conf. RCV		Mailbox is full.	
816	Conf. Polled		The received Polling Password did not match.	
825	Conf. RCV Conf. Polled		Parameter settings of the remote station are not properly set.	

Information Codes				
Code	Mode	Phase	Description of Problem	Cause
870	MEM XMT Multi-Copy	-	Memory overflow occurred while storing documents into memory.	
879	Memory RCV	PSTN	Memory overflow occurred during substitute memory reception.	
		LAN	Memory overflow. Mail Server sent a reset command while downloading the data to the machine.	Memory overflow on the Fax side. Mail server aborted the download (Busy with other higher priority jobs).
880	-	-	File Access Error.	
884	-	-	File Access Error.	
961	RCV	LAN	Memory file access error.	FCB PCB is defective.
962	XMT	PSTN	Memory file access error.	FCB PCB is defective.
		LAN	Memory file access error.	FCB PCB is defective.

4.9. Diagnostic Codes

The 13-digit Diagnostic Code is provided for the service engineer to analyze how the communication was performed. The code is recorded on the Journal.

Journal Example

***** -JOURNAL- ***** DATE SEP-12-1999 ***** TIME 09:39*****												
NO.	COMM.	PAGES	FILE	DURATION	X/R	IDENTIFICATION	DATE	TIME	DIAGNOSTIC			
01	OK	001	129	00:00'42	XMT	123 456 789	SEP-12	01:55	C8649003C0000			
									1st digit		13th digit	
- PANASONIC PANAFAX DX-2000												
***** - PANAFAX DX-2000- ***** -12345678901234567890- *****												

1st Digit: Manufacturer Code

:- Not used/defined

Data	Definition			
	Manufacturer Code			
0				
1	Casio			
2	Canon			
3	Sanyo			
4	Sharp			
5	Tamura			
6	Toshiba			
7	NEC			
8	Oki			
9	Hitachi			
A	Xerox			
B	Fujitsu			
C	Matsushita			
D	Mitsubishi			
E	Murata			
F	Ricoh			

2nd Digit

:- Not used/defined

Data	Definition			
	ID (TSI, CSI, CIG)	RTN	DCN	STOP Button
0	-	-	-	-
1	Received	-	-	-
2	-	Received	-	-
3	Received	Received	-	-
4	-	-	Received	-
5	Received	-	Received	-
6	-	Received	Received	-
7	Received	Received	Received	-
8	-	-	-	Pressed
9	Received	-	-	Pressed
A	-	Received	-	Pressed
B	Received	Received	-	Pressed
C	-	-	Received	Pressed
D	Received	-	Received	Pressed
E	-	Received	Received	Pressed
F	Received	Received	Received	Pressed

3rd Digit

-: Not used/defined

Data	Definition			
	Resolution (dpi)	Paper Width		
0	-	A4		
1	S-Fine	A4		
2	400 x 400	A4		
3	300 x 300	A4		
4	-	B4		
5	S-Fine	B4		
6	400 x 400	B4		
7	300 x 300	B4		
8	-	-		
9	-	-		
A	-	-		
B	-	-		
C	-	A3		
D	S-Fine	A3		
E	400 x 400	A3		
F	300 x 300	A3		

4th Digit

-: Not used/defined

Data	Definition			
	Scanning Rate	Resolution		
0	20 ms/line	Std		
1	5 ms/line	Std		
2	10 ms/line	Std		
3	-	Std		
4	40 ms/line	Std		
5	-	Std		
6	-	Std		
7	0 ms/line	Std		
8	20 ms/line	Fine		
9	5 ms/line	Fine		
A	10 ms/line	Fine		
B	-	Fine		
C	40 ms/line	Fine		
D	-	Fine		
E	-	Fine		
F	0 ms/line	Fine		

5th Digit

-: Not used/defined

Data	Definition			
	Deferred Comm.	Dialing/RCV	Memory/Non-Memory	
0	-	Manual Communication	Non-Memory	
1	Used	Manual Communication	Non-Memory	
2	-	Auto Dialing	Non-Memory	
3	Used	Auto Dialing	Non-Memory	
4	-	Auto RCV	Non-Memory	
5	Used	Auto RCV	Non-Memory	
6	-	Remote RCV	Non-Memory	
7	Used	Remote RCV	Non-Memory	
8	-	Manual Communication	Memory	
9	Used	Manual Communication	Memory	
A	-	Auto Dialing	Memory	
B	Used	Auto Dialing	Memory	
C	-	Auto RCV	Memory	
D	Used	Auto RCV	Memory	
E	-	Remote RCV	Memory	
F	Used	Remote RCV	Memory	

6th Digit

-: Not used/defined

Data	Definition			
	Polling	XMT/RCV	Selective Comm.	Password Comm.
0	-	RCV	Off	Off
1	Yes	RCV	Off	Off
2	-	XMT	Off	Off
3	Yes	XMT	Off	Off
4	-	RCV	On	Off
5	Yes	RCV	On	Off
6	-	XMT	On	Off
7	Yes	XMT	On	Off
8	-	RCV	Off	On
9	Yes	RCV	Off	On
A	-	XMT	Off	On
B	Yes	XMT	Off	On
C	-	RCV	On	On
D	Yes	RCV	On	On
E	-	XMT	On	On
F	Yes	XMT	On	On

7th Digit

-: Not used/defined

Data	Definition			
	Sub-address Comm.	Confidential Comm.	Relayed Comm.	Turnaround Polling
0	-	-	-	-
1	Yes	-	-	-
2	-	Yes	-	-
3	Yes	Yes	-	-
4	-	-	Yes	-
5	Yes	-	Yes	-
6	-	Yes	Yes	-
7	Yes	Yes	Yes	-
8	-	-	-	Yes
9	Yes	-	-	Yes
A	-	Yes	-	Yes
B	Yes	Yes	-	Yes
C	-	-	Yes	Yes
D	Yes	-	Yes	Yes
E	-	Yes	Yes	Yes
F	Yes	Yes	Yes	Yes

8th Digit

-: Not used/defined

Data	Definition			
	Advanced Comm.	Cover Sheet XMT		
0	-	-		
1	Report XMT	-		
2	Check & Call	-		
3	-	-		
4	Memory Transfer	-		
5	-	-		
6	-	-		
7	-	-		
8	-	Yes		
9	Report XMT	Yes		
A	Check & Call	Yes		
B	-	Yes		
C	Memory Transfer	Yes		
D	-	Yes		
E	-	Yes		
F	-	Yes		

9th Digit

-: Not used/defined

Data	Definition			
	Short Protocol	Standard/ Non-Standard		
0	-	Standard		
1	-	Standard		
2	-	Standard		
3	-	Standard		
4	-	Standard		
5	-	Standard		
6	-	Standard		
7	-	Standard		
8	-	Non-Standard		
9	B	Non-Standard		
A	-	Non-Standard		
B	D	Non-Standard		
C	-	Non-Standard		
D	B	Non-Standard		
E	-	Non-Standard		
F	D	Non-Standard		

10th Digit

-: Not used/defined

Data	Definition			
	Coding	ECM		
0	MH	-		
1	MR	-		
2	MMR	-		
3	JBIG	-		
4	-	-		
5	-	-		
6	-	-		
7	-	-		
8	MH	Yes		
9	MR	Yes		
A	MMR	Yes		
B	JBIG	Yes		
C	-	Yes		
D	-	Yes		
E	-	Yes		
F	-	Yes		

11th Digit

-: Not used/defined

Data	Definition			
	Symbol Rate (V.34)	V.34		
0	-	-		
1	-	-		
2	-	-		
3	-	-		
4	-	-		
5	-	-		
6	-	-		
7	-	-		
8	2400 sr	Yes		
9	-	Yes		
A	2800 sr	Yes		
B	3000 sr	Yes		
C	3200 sr	Yes		
D	3429 sr	Yes		
E	-	Yes		
F	-	Yes		

12th Digit

-: Not used/defined

Data	Definition			
	Modem Speed	Modem Speed (V.34)		
0	2400 bps	-		
1	4800 bps	2400 bps		
2	7200 bps	4800 bps		
3	9600 bps	7200 bps		
4	TC 7200 bps	9600 bps		
5	TC 9600 bps	12000 bps		
6	12000 bps	14400 bps		
7	14400 bps	16800 bps		
8	-	19200 bps		
9	-	21600 bps		
A	-	24000 bps		
B	-	26400 bps		
C	-	28800 bps		
D	-	31200 bps		
E	-	33600 bps		
F	-	-		

13th Digit

-: Not used/defined

Data	Definition			
0				
1				
2				
3				
4				
5				
6				
7				
8				
9				
A				
B				
C				
D				
E				
F				

5 Service Modes

5.1 Service Mode Table

The following service modes are provided to assist you in setting operational functions of the unit and determining the condition of the unit.

No.	Service Mode	Description
1	Function Parameter Setting	Allows changes to the function parameters (the home position, etc...).
2	Not used	
3	Print Parameter List / Reports	Prints the Function Parameter List, Page Memory Test, Printer Report, All Document File, Protocol Trace and Toner Order Form.
4	Modem Tests	Generates various binary, tonal and DTMF signals, by the modem.
5	Diagnostic	Performs various hardware tests.
6	RAM Initialization	Initialize RAM and restore the default value of the function parameters.
7	LBP Service Mode	Changes the Printer Parameters (the home position, etc.).
8	Check & Call	Allows input of information for Service Alert Report, Maintenance Alert Report and Toner Order Form.
9	System Maintenance	Used for Firmware Update, Firmware Backup, Parameter Restore, Parameter Backup, Transferring Firmware from the PC to the Flash Card and Sending a Received File during a fatal printer error.

5.2 Service Mode 1 (Function Parameter Setting)

Use the following procedure to change the function parameters.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "1".	PARAMETER (000-199) ENTER PARAMETER #_
5	Enter the Function Parameter Number. Ex: Changing the "ALARM STATUS" -- Enter "001" and press [SET].	PARAMETER #001 ALARM STATUS?
6	Press "START".	ALARM STATUS:Timer 1:OFF 2:Tmr 3:CONST
7	Enter the new setting value. Ex: Enter "3" for Constant.	ALARM STATUS:Const. 1:OFF 2:Tmr 3:CONST
8	Press "START". The new value will be stored and the next parameter will be displayed.	PARAMETER #002 STOP COMM.JRNL?
9	Repeat steps 4 through 7 to change other Function Parameters or Press "STOP" twice to return to standby.	SEP-12-1999 15:00 00%

Note:

The following buttons provide these functions in the test mode:

"START" : The new setting value is stored in the machine.

"V" : Scroll the function parameter number down.

"^" : Scroll the function parameter number up.

Function Parameter Table			
No.	Parameter (see Note 3)	Selections	Function
000	MON/TEL DIAL	1 = Monitor 2 = TEL/DIAL	Selects whether the machine starts to TX automatically during On-Hook dialing. Monitor : Start to TX after pressing START TEL/DIAL : Start to TX automatically
001	ALARM STATUS	1 = OFF 2 = Timer (6 sec.) 3 = Constant	Selects the No Paper or No Toner alarm status. OFF : Alarm is disabled. Timer : Alarm will shut off after 6 seconds. Constant : Alarm will not stop until "STOP" is pressed or the error is cleared/corrected.
002	STOP COMM. JRNL	1 = Off 2 = On	Selects whether the machine prompts to print the COMM. Journal when the printout condition is set to INC and STOP is pressed during communication.
003	Not Used		
004	NUMERIC ID SET	1 = Off (will not accept) 2 = On (accepts)	Selects whether the machine accepts and allows to set or change the Numeric ID.
005	Not Used		
006	ID DISPLAY	1 = Number (Numeric ID) 2 = Chara (Character ID)	Selects the priority of displaying the ID.
007	JNL COLUMN	1 = Preset station name 2 = Received ID	Selects the contents of the ID to display on the Journal.
008	MONITOR	1 = Off 2 = On	Selects whether the Monitor is ON/OFF for monitoring fax signals. (FOR SERVICE USE ONLY)
009	DC LOOP	1 = Off (Normal) 2 = On (Off Hook)	Selects a false Off Hook state for back to back communication test.
010	TX LEVEL	00 = 0 dBm ~ 15 = -15 dBm	Selects the TX signal output level, 0 to -15 dBm in 1 dBm steps. (Refer to Chapter 4.3)
011	RX LEVEL	1 = -43 dBm 2 = -38 dBm 3 = -33 dBm 4 = -48 dBm	Selects the receiving sensitivity of -33/-38/-43/-48 dBm. (Refer to Chapter 4.3)
012	DTMF LEVEL	00 = 0 dBm ~ 15 = -15 dBm	Selects the DTMF output level, 0 to -15 dBm in 1 dBm steps.
013	G3 RX EQL	1 = 0dB 2 = 4dB 3 = 8dB 4 = 12dB	Selects the cable equalizer for G3 reception mode, 0dB, 4dB, 8dB or 12dB.
014	G3 TX EQL	1 = 0dB 2 = 4dB 3 = 8dB 4 = 12dB	Selects the cable equalizer for G3 transmission mode, 0dB, 4dB, 8dB or 12dB.
015 ~ 016	Not Used		
017	TX START	1 = 2400 bps 2 = 4800 bps 3 = 7200 bps 4 = 9600 bps 5 = TC7200 bps 6 = TC9600 bps 7 = 12000 bps 8 = 14400 bps	Selects the transmission modem start speed, 14400/12000/TC9600/TC7200/9600/7200/4800/2400 bps. Note : This parameter is applicable only when communicating with regular G3 machines. When communicating with Super G3 (V.34) machines, use Parameter No. 32.
018	RX START	1 = 2400 bps 2 = 4800 bps 3 = 7200 bps 4 = 9600 bps 5 = TC7200 bps 6 = TC9600 bps 7 = 12000 bps 8 = 14400 bps	Selects the reception modem start speed, 14400/12000/TC9600/TC7200/9600/7200/4800/2400 bps. Note : This parameter is applicable only when communicating with regular G3 machines. When communicating with Super G3 (V.34) machines, use Parameter No. 33.
019	ITU-T V.34	1 = Off 2 = On 3 = Select	Selects whether the ITU-T V.34 is Off, On or Select. Select : Select whether the ITU-T V.34 is Off or On, when entering One-Touch/Abbreviated Dialing Numbers or Manual Number Dialing.

Function Parameter Table			
No.	Parameter (see Note 3)	Selections	Function
020	ITU-T ECM	1 = Off (Invalid) 2 = On (Valid)	Select the ECM mode.
021	EP TONE	1 = Off (without EP Tone) 2 = On (with EP Tone)	Selects whether to add the echo protect tone on V.29 mode. (Used when Echo Suppression is disabled.) On: Add Off: Do not add
022	SIGNAL INTERVAL	1 = 100 ms 2 = 200 ms 3 = 500 ms	Selects the time interval between the receiving signal and the transmitting signal.
023	TCF CHECK	1 = Normal (Short) 2 = Long	Selects the TCF check interval Long/Short
024	CED FREQUENCY	1 = 1080 Hz (non CCITT) 2 = 2100 Hz	Selects the CED frequency 2100/1080 Hz
025	COMM. START-UP	1 = 1 st response 2 = 2 nd response	Selects the communication start-up condition (XMT and Polling). (Used when Echo Suppression is disabled.)
026	NON-STANDARD	1 = Off (Invalid) 2 = On (Valid)	Selects own mode (Panafax mode).
027	SHORT PROTOCOL B	1 = Off (Invalid) 2 = On (Valid)	Selects the short protocol mode.
028	SHORT PROTOCOL D	1 = Off (Invalid) 2 = On (Valid)	Selects the short protocol mode.
029	REMOTE DIAGNOSTICS	1 = Off (will not accept) 2 = On (accepts)	Selects whether the machine accepts the Remote Diagnostics from the service station.
030	CED & 300 bps	1 = 75 ms 2 = 1 sec	Selects the pause interval between the CED and the 300 bps signal. (Used when Echo Suppression is disabled.)
031	RTC = EOLx12	1 = Off (EOLx6) 2 = On (EOLx12)	Selects the RTC signal, EOLx6 or EOLx12.
032	V34 TX START	2400-33600bps	Selects the transmission modem start speed for V.34 communication, 33600-2400 bps.
033	V34 RX START	2400-33600bps	Selects the receiving modem start speed for V.34 communication, 33600-2400 bps.
034	V34 TX Symbol Rate	2400-3429sr	Selects the transmission symbol rate for V.34, 3429/3200/3000/2800/2400 sr. Press "v" or "^" to select the symbol rate.
035	V34 RX Symbol Rate	2400-3429sr	Selects receiving symbol rate for V.34, 3429/3429/3200/3000/2800/2400 sr. Press "v" or "^" to select the symbol rate.
036	Not Used		
037	PROTOCOL DISPLAY	1 = Off (not displayed) 2 = On (displayed)	Selects whether to display the modem speed during communication. (Press "v" or "^" to display)
038	Not Used		
039	FLASH TIME	5 = 50 ms ~ 100 = 1000 ms	Selects the pause interval before activating the Flash key.
040	E/F TIME (For Germany, Austria and Switzerland only)	5 = 50 ms ~ 100 = 1000 ms	Selects the pause interval before activating the Flash key.
041	PAUSE TIME	1 = 1 sec. ~ 10 = 10 sec.	Selects the pause interval from 1 sec. ~ 10 sec. for dialing through a switchboard or for international calls.
042	Not Used		
043	REDIAL INTERVAL	0 = no waiting ~ 15 = 15 minutes	Selects the redial interval from 0 to 15 minutes in 1 minute steps.
044	REDIAL COUNT	0 = no redial ~ 15 = 15 times	Selects the redial count from 0 to 15 times in 1 step intervals.
045	RING DETECT COUNT	1 = 1 ring ~ 9 = 9 rings	Selects the ring detection count from 1 to 9 rings in 1 ring step intervals.
046	ON-HOOK TIME	0 = 0 sec. ~ 90 = 90 sec.	Selects the on-hook time between sequential communication calls in 1 second step intervals.
047	RESPONSE WAIT	1 = 1 sec. ~ 90 = 90 sec.	Selects the waiting interval for the response after completing the dialing.

Function Parameter Table			
No.	Parameter (see Note 3)	Selections	Function
048 049	Not Used		
050	RING DETECT MODE	1 = Normal 2 = Rough	Selects the quality of ringer detection. Use if the line signal is out of regulation, set to "Rough" so that the unit may detect the ringing signals.
051	Not Used		
052	PULSE RATE	1 = 10 pps 2 = 20 pps	Selects the dial pulse rate 10/20 pps.
053 054	Not Used		
055	BUSY TONE CHECK	1 = Off 2 = On	Selects whether to detect the Busy Tone.
056	DIAL TONE CHECK (Except for USA and Canada version)	1 = Off 2 = On	Selects whether to detect dial tone before dialing the telephone number.
057	DC LOOP CHECK (Except for USA and Canada version)	1 = Off (will not check) 2 = On (checks)	Selects whether the unit checks the DC Loop during communication.
058	COMM.JRNL +IMAGE	1 = Off (without image) 2 = On (with image)	Selects whether the machine prints the COMM. Journal with image.
059	Not Used		
060	VERSION	Indicates the FAX software version.	
061	TX/RX//PRT/CPY COUNTER	TX/RX/PRT/CPY	Displays the transmitted, received, total printed and copied document count.
062	PRINT COUNTER	1 = Off 2 = On	Selects whether to print in the Fax Parameter List, the counter information that is displayed in the Function Parameter No. 61.
063 ~ 067	Not Used		
068	NYSE FAX FORWARD	1=Off 2=On	Selects whether the machine will forward the incoming and outgoing faxes to a specified ABBR or One-Touch station.
069	NYSE LOCAL PRINT	1=INC 2=ON (Allways)	Selects the printing condition for the incoming faxes after FAX Forwarding. INC. : Prints only if FAX Forwarding fails. ON : Always prints.
070	LINE ERROR	1 = 128 lines 2 = 256 lines 3 = 512 lines 4 = 1024 lines 5 = 2048 lines 6 = Off (will not disconnect line)	1. Selects the line disconnect condition during reception. If the number of line errors exceed this setting, the unit will disconnect the line. 2. Selects the transmit condition of RTP/PIP or RTN/PIN. (Available if No.73 ERROR DETECT is set to "LINES") (See Note 1)
071	TOTAL ERROR	1 = 5% 2 = 10% 3 = 15% 4 = 20%	Selects the transmit condition of RTP/PIP or RTN/PIN. (Available if No.73 ERROR DETECT is set to "RATE") (See Note 2)
072	CONTINUOUS ERROR	1 = Off (unlimited) 2 = 3 lines/STD 3 = 6 lines/STD 4 = 12 lines/STD	Selects the continuous total error criteria of Off/3/6 or 12 lines in Standard mode. If continuous total error exceeds this setting, the unit will transmit RTN/PIN. (Available if No.73 ERROR DETECT is set to "RATE".)
073	ERROR DETECT	1 = Lines 2 = Rate	Selects the error detect condition Lines/Rate.
074	RTN RECEIVE	1 = Disconnect 2 = Continue	Selects whether to disconnect the phone line or continue when "RTN" is received.
075	MH/MR/MMR/JBIG	1 = MH (MH only) 2 = MR (MH or MR) 3 = MMR (MH or MR or MMR) 4 = JBIG	Selects the coding scheme.
076	Not Used		
077	RX JAM LENGTH	1 = Off (unlimited) 2 = 2 m 3 = 8 m	Selects the maximum length of a received document that can be printed.
078 079	Not Used		
080	DOC TOP FEED	-5.0 mm ~ +5.0 mm	Adjusts the distance between the scanning sensor ON position and the scanning start position.

Function Parameter Table			
No.	Parameter (see Note 3)	Selections	Function
081	DOC END FEED	-5.0 mm ~ +5.0 mm	Adjusts the distance between the scanning sensor OFF position and the scanning end position.
082	JAM LENGTH	1 = 1 m 2 = 2 m 3 = 8 m 4 = Unlimited	Selects the maximum length of the document that can be scanned.
083	Not Used		
084	LINE AS NO PAPER	1 = Ring (ring) 2 = Busy (keep line busy)	Selects whether to ring or send a busy tone to the remote station when the recording paper runs out or the unit cannot receive because of any trouble.
085	Not Used		
086	REDUCTION FINE	1 = Off 2 = On	Selects whether the resolution is preset to Fine, when sending with reduction B4 → A4.
087	DARKER LEVEL	0 = Lightest Contrast	Selects the contrast level.
088	NORMAL LEVEL	~	0 ← → 15
089	LIGHTER LEVEL	15 = Darkest Contrast	Lightest ← → Darkest
090	Not Used		
091			
092	SMOOTHING	1 = Off 2 = On	Selects whether the smoothing function is available.
093	Not Used		
~			
109			
110	MAC ADDRESS		Indicates the MAC Address.
111	LAN I/F ROM VER		Indicates the LAN I/F Firmware version.
112	INSERT EMAIL TXT	1 = Off 2 = On	Selects whether the Text Template (email message) is programmable and added on all email sent in the message body above the top line of text. (Up to 40 characters Programmed in the User Parameters.)
113	Not Used		
114	SYMBOL SET	1=Standard 2=Extended	Selects whether the extended symbols other than "%" is available for Internet Parameters entry.
115	TIME ZONE	1=SCROLL 2=DIRECT	Selects the setting method for Time Zone. Scroll : Allows using <or> to scroll through the Time Zone Table. Direct : Allows you to input the Time Zone directly, (*)key to be used as a switch between +/-.
116	OVERWRITE WARNING	1 = Yes 2 = No	Selects whether the Overwrite Warning is included on the Internet FAX Result Receipt when programming the Auto Dialer via email.
117	Not Used		
~			
132			
133	COLLATION (PRT)	1 = Off 2 = On 3 = Auto	Selects the Print Collation in Printer Interface Mode. When "Auto" is selected, print collation will operate according to the setting in Fax Parameter #65.
134	Not Used		
135	JOB END TIMER	1 sec. ~ 999 sec.	Selects the Guard Timer while printing a data with the Panafax Printing System ver. 5e/6.
136	JAM RECOVERY	1 = Off 2 = On	Selects the JAM Recovery function in the PDL Printer Interface Mode. Off: Printing performance is faster, however if a paper jam occurs the jammed pages will not be reprinted automatically. On: Printing performance is slower, however if a paper jam occurs the jammed pages will be reprinted automatically.
137	Not Used		
~			
159			
160	VERSION	Indicates the ROM version on the FRM PC Board.	
161	Not Used		
~			
199			

Note 1: Function Parameter No. 070 (LINE ERROR)-Transmit condition of RTP/PIP or RTN/PIN

Signal	Setting					
	1:128	2:256	3:512	4:1024	5:2048	6:Off
MCF/PIP	0-31	0-63	0-127	0-255	0-511	Always
RTP/PIP	32-63	64-127	128-255	256-511	512-1023	-
RTN/PIN	64-127	128-255	256-511	512-1023	1024-2047	-

Note 2: Function Parameter No. 071 (TOTAL ERROR)-Transmit condition of RTP/PIP or RTN/PIN

Signal	Setting			
	1:5%	2:10%	3:15%	4:20%
MCF/PIP	0-2	0-4	0-7	0-9
RTP/PIP	3-4	5-9	8-14	10-19
RTN/PIN	5-	10-	15-	20-

Note 3: The default setting of parameters depends on the country's specifications or regulations. Print the Function Parameter List to confirm the default settings.

5.3 Service Mode 3 (Printout of Lists, Reports and Test Results)

From this Service Mode you can print the Function Parameter List, Page Memory Test, Printer Report, All Document File, Protocol Trace and the Toner Order Form.

5.3.1 Function Parameter List

A list of all Function Parameters can be printed by the following procedure.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "3".	SERVICE MODE ENTER NO. OR V ^
4	Press "3".	PRINTOUT (1-7) 1:FUNC. PARAM. LIST
5	Press "START".	* PRINTING * FUNC. PARAMETER LIST
6	After printing is completed, the unit returns to the display in step 3.	SERVICE MODE ENTER NO. OR V ^
7	Press "STOP" to return to standby.	SEP-12-1999 15:00 00%

Function Parameter List (Sample)

***** -FUNCTION PARAMETER- ***** DATE SEP-12-1999 ***** TIME 12:07 ***P.01

000 MON/TEL DIAL:[Monitor] Monitor	050 RING DET MODE:[Normal] Normal
001 ALARM STATUS:[Timer] Timer	051 -----
002 STOP COMM.JRNL:[On] On	052 PULSE RATE:[10pps] 10pps
003 -----	053 -----
004 NUMERIC ID SET:[On] On	054 -----
005 -----	055 BUSY TONE CHECK:[On] On
006 ID DISPLAY:[Chara] Chara	056 -----
007 JNL COLUMN:[Station] Station	057 -----
008 MONITOR:[Off] Off	058 COMM. JRNL +IMAGE:[On] On
009 DC LOOP:[Off] Off	059 -----
010 TX LEVEL:[-9dBm] -9dBm	060 VERSION: DX-2000 ALV00300AU
011 RX LEVEL:[-43dBm] -43dBm	061 TX/RX/PRT/CPY:000080/000168/000003/000000
012 DTMF LEVEL:[-5dBm] -5dBm	062 PRINT COUNTER:[Off] Off
013 G3 RX EQL:[0dB] 0dB	063 -----
014 G3 TX EQL:[0dB] 0dB	064 -----
015 -----	065 -----
016 -----	066 -----
017 TX START:[14400bps] 14400bps	067 -----
018 RX START:[14400bps] 14400bps	068 NYSE FAX FORWARD:[Off] Off
019 ITU-T V.34:[On] On	069 NYSE LOCAL PRINT:[Inc] inc
020 ITU-T ECM:[On] On	070 LINE ERROR:[128] 128
021 EP TONE:[Off] Off	071 TOTAL ERROR:[10] 10
022 SIG. INTERVAL:[500ms] 500ms	072 CONTI. ERROR:[Off] Off
023 TCF CHECK:[Normal] Normal	073 ERROR DETECT:[Rate] Rate
024 CED FREQ.: [2100Hz] 2100Hz	074 RTN RECEIVE:[Discon] Discon
025 COMM. START-UP:[1'st] 1'st	075 CODING:[JBIG] JBIG
026 NON-STANDARD:[On] On	076 -----
027 SHORT PROTOCOL B:[On] On	077 RX JAM LENGTH:[2 m] 2 m
028 SHORT PROTOCOL D:[On] On	078 -----
029 REMOTE DIAG.: [On] On	079 -----
030 CED & 300bps:[75ms] 75ms	080 DOC TOP FEED:[0.0mm] 0.0mm
031 RTC=EQL x 12:[Off] Off	081 DOC END FEED:[0.0mm] 0.0mm
032 V34TX START:[33600bps] 33600bps	082 JAM LENGTH:[2 m] 2 m
033 V34RX START:[33600bps] 33600bps	083 -----
034 V34 TX SR:[3429sr] 3429sr	084 LINE AS NOPAPER:[Ring] Ring
035 V34 RX SR:[3429sr] 3429sr	085 -----
036 -----	086 REDUCTION FINE:[On] On
037 PROTOCOL DISPLAY:[Off] Off	087 DARKER LEVEL:[4] 4
038 -----	088 NORMAL LEVEL:[8] 8
039 FLASH TIME:[500] 500ms	089 LIGHTER LEVEL:[12] 12
040 E/F TIME:[500] 500ms	090 -----
041 PAUSE TIME:[3sec] 3sec	091 -----
042 -----	092 SMOOTHING:[On] On
043 REDIAL INTERVAL:[3min] 3min	093 -----
044 REDIAL COUNT:[5] 5	094 -----
045 RING DET. COUNT:[2] 2	095 -----
046 ON-HOOK TIME:[5sec] 5sec	096 -----
047 RESPONSE WAIT:[55sec] 55sec	097 -----
048 -----	098 -----
049 -----	099 -----

Note:The power must be reset for the new parameter settings to take effect.

-PANASONIC DX-2000-

***** -PANAFAX- DX-2000 - ***** -12345678901234567890- *****

Function Parameter List (Sample)

***** -FUNCTION PARAMETER- ***** DATE SEP-12-1999 ***** TIME 12:07 ***P.02

100 -----	150 -----
101 -----	151 -----
102 -----	152 -----
103 -----	153 -----
104 -----	154 -----
105 -----	155 -----
106 -----	156 -----
107 -----	157 -----
108 -----	158 -----
109 -----	159 -----
110 MAC ADDRESS:080023000177	160 VERSION: OPTPEBBV31509
111 LAN I/F VERSION : OPTLAAAV00600AU	161 -----
112 INSERT EMAIL TXT:[Off] Off	162 -----
113 -----	163 -----
114 SYMBOL SET:[Std] Std	164 -----
115 TIME ZONE:[Direct] Direct	165 -----
116 OVERWRITE WARNING:[Yes] Yes	166 -----
117 -----	167 -----
118 -----	168 -----
119 -----	169 -----
120 -----	170 -----
121 -----	171 -----
122 -----	172 -----
123 -----	173 -----
124 -----	174 -----
125 -----	175 -----
126 -----	176 -----
127 -----	177 -----
128 -----	178 -----
129 -----	179 -----
130 -----	180 -----
131 -----	181 -----
132 -----	182 -----
133 COLLATION(PRT):[Auto] Auto	183 -----
134 -----	184 -----
135 JOB END TIMER:[30sec] 30sec	185 -----
136 JAM RECOVERY:[Off] Off	186 -----
137 -----	187 -----
138 -----	188 -----
139 -----	189 -----
140 -----	190 -----
141 -----	191 -----
142 -----	192 -----
143 -----	193 -----
144 -----	194 -----
145 -----	195 -----
146 -----	196 -----
147 -----	197 -----
148 -----	198 -----
149 -----	199 -----

Note:The power must be reset for the new parameter settings to take effect.

-PANASONIC DX-2000-

***** -PANAFAX- DX-2000 - ***** -12345678901234567890- *****

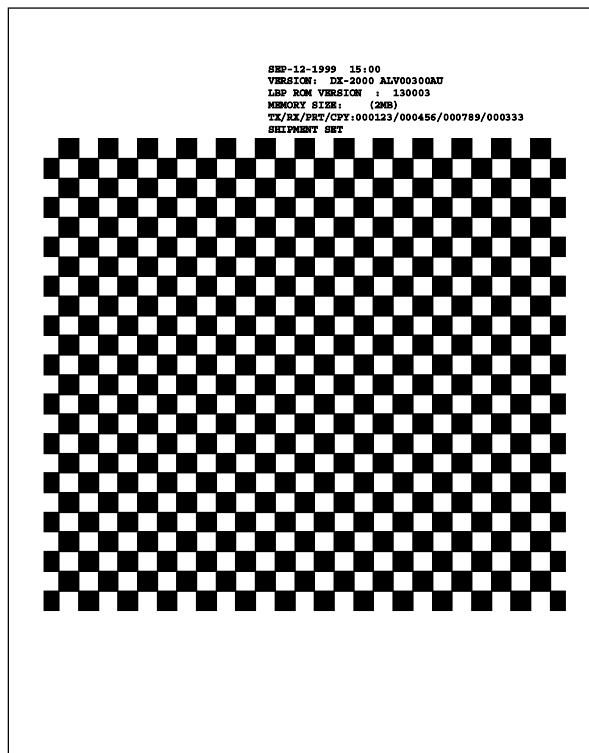
Note:

1. [] - Factory Default
2. The contents of the Function Parameter List may vary depending on the country's regulations.
3. "*" mark will be shown on the left side of number when setting was changed from default.

5.3.2 Page Memory Test

A test pattern prints out for checking the page memory (IC120 and IC121 on the FCB PCB) and printer mechanism using the following procedure.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "3".	PRINTOUT (1-7) 1:FUNC. PARAM. LIST
5	Press "3" and "START".	* PRINTING * PAGE MEMORY TEST
6	After printing is completed, the unit returns to the display in step 3.	SERVICE MODE ENTER NO. OR V ^
7	Press "STOP" to return to standby.	SEP-12-1999 15:00 00%



5.3.3 Printer Report

All printer errors are logged on the Printer Report which can be printed by the following procedure.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "3".	PRINTOUT (1-7) 1:FUNC. PARAM. LIST
5	Press "4" and "START".	* PRINTING * PRINTER REPORT
6	After printing is completed, the unit returns to the display in step 3.	SERVICE MODE ENTER NO. OR V ^
7	Press "STOP" to return to standby.	SEP-12-1999 15:00 00%

*****-PRINTER REPORT-***** DATE SEP-12-1999 ***** TIME 19:02*****	
LAST PRINT ERROR	: SEP-12 15:38 NO. 001-12
CUSTOMER ID	: 1234567890123456
FAX ROM VERSION	: DX-2000 ALV03000AU
LBP ROM VERSION	: 130002
TRANSMIT COUNTER	: 000475
RECEIVE COUNTER	: 000398
COPY COUNTER	: 001083
PRINT COUNTER	: 001128
PRINT ERROR	: 1.SEP-11-1999 15:38 NO.001-12
	: 2.SEP-10-1999 10:48 NO.001-11
	: 3.SEP-09-1999 15:23 NO.004-36
*****-PARAMAX DX-2000-***** *****-12345678901234567890-*****	

1. Printer Error Code Table

Error Code	Description of Problems	Cause
00	No problem detected	
10	The Timing Sensor turned OFF before a certain period of time.	1. Recording Paper Jam. 2. Timing Sensor defective 3. Incorrect paper size setting.
11	Timing Sensor did not turn ON within a certain period of time. (Original Cassette Feeder)	1. Recording Paper misfeeding, Paper Feed Roller defective. 2. Drive Clutch defective. 3. Timing Sensor defective.
12	Timing Sensor did not turn On within a certain period of time. (250 sheet Optional Cassette Feeder)	1. Recording Paper misfeeding, Paper Feed Roller defective. 2. Drive Clutch defective. 3. Timing Sensor defective.
13	Timing Sensor did not turn On within a certain period of time. (500 sheet Optional Cassette Feeder)	1. Recording Paper misfeeding, Paper Feed Roller defective. 2. Drive Clutch defective. 3. Timing Sensor defective.
14	Timing Sensor did not turn OFF within a certain period of time.	1. Recording Paper Jam. 2. Timing Sensor defective 3. Incorrect paper size setting.
15	Paper Eject Sensor did not turn ON within a certain period of time.	1. Recording Paper Jam. 2. Paper Eject Sensor defective.
16	Paper Eject Sensor did not turn OFF within a certain period of time.	1. Recording Paper Jam. 2. Paper Eject Sensor defective.
17	Timing Sensor detected paper while initializing the unit.	1. Recording Paper jammed in the unit. 2. Timing Sensor defective.
18	Paper Cassette was removed while Recording Paper was Feeding.	1. Recording Paper jammed in the unit. 2. Paper Eject Sensor defective.
1B	Paper Cassette was removed while Recording Paper was Feeding.	1. Recording Paper Jam.
22	The temperature of the Fuser Roller remained low even after the circuit was activated.	1. Fuser Unit defective. 2. LPC PCB defective. 3. LVPS defective.
23	Abnormally high Fuser Roller temperature after the circuit was de-activated.	1. Fuser Unit defective. 2. LPC PCB defective. 3. LVPS defective.
24	The temperature of the Fuser Roller was not controlled within a certain margin.	1. Fuser Unit defective. 2. LPC PCB defective. 3. LVPS defective.
25	Thermistor open.	1. Thermistor defective (Fuser Unit). 2. LPC PCB defective.
26	Thermostat detected temperature over 200°C.	1. Thermostat defective (Fuser Unit). 2. LPC PCB defective. 3. LVPS defective.
31	The Polygon Motor did not reach a constant speed of 10000 rpm within a certain period of time.	1. LSU defective.
32	The Polygon Motor did not maintain a constant speed of 10000 rpm.	1. LSU defective.
36	HSYNC signal abnormal.	1. LSU defective. 2. LPC PCB defective.
41	Fan does not rotate.	1. Fan defective. 2. LPC PCB defective.
54	A/D Converter error.	1. LPC PCB defective.
55	Printer Motor Ready Signal abnormal.	1. Connector is not properly connected. 2. Printer Motor defective. 3. LPC PCB defective.
61	Unit detected "No Toner Cartridge".	1. Toner Cartridge not installed. 2. Toner Sensor defective.
63	Unit detected "Printer Door Open".	1. Printer door is not closed. 2. ILS PCB defective.
64	Unit detected "No Cassette".	1. Cassette not installed or partially open. 2. Cassette Sensor defective.
65	Unit detected "Out of Paper".	1. Cassette(s) ran out of receiving paper. 2. Paper Detect Sensor defective.
68	Jam Access Cover of Optional 250 Sheet Feeder is open.	1. Jam Access Cover Sensor of Optional 250 Sheet Feeder defective.
69	Jam Access Cover of Optional 500 Sheet Feeder is open.	1. Jam Access Cover Sensor of Optional 500 Sheet Feeder defective.
71	Interface error occurs with the 500 sheet optional cassette.	1. CN101 is disconnected. 2. CST3 PCB defective.

Note:

If an 021 series Error Code occurs, 021-25 (Thermistor Open) or 021-26 (Thermistor detected temperature over 200 °C), a pre-programmed recovery safety software is activated to protect the unit and the service personnel during abnormal increase in temperature.

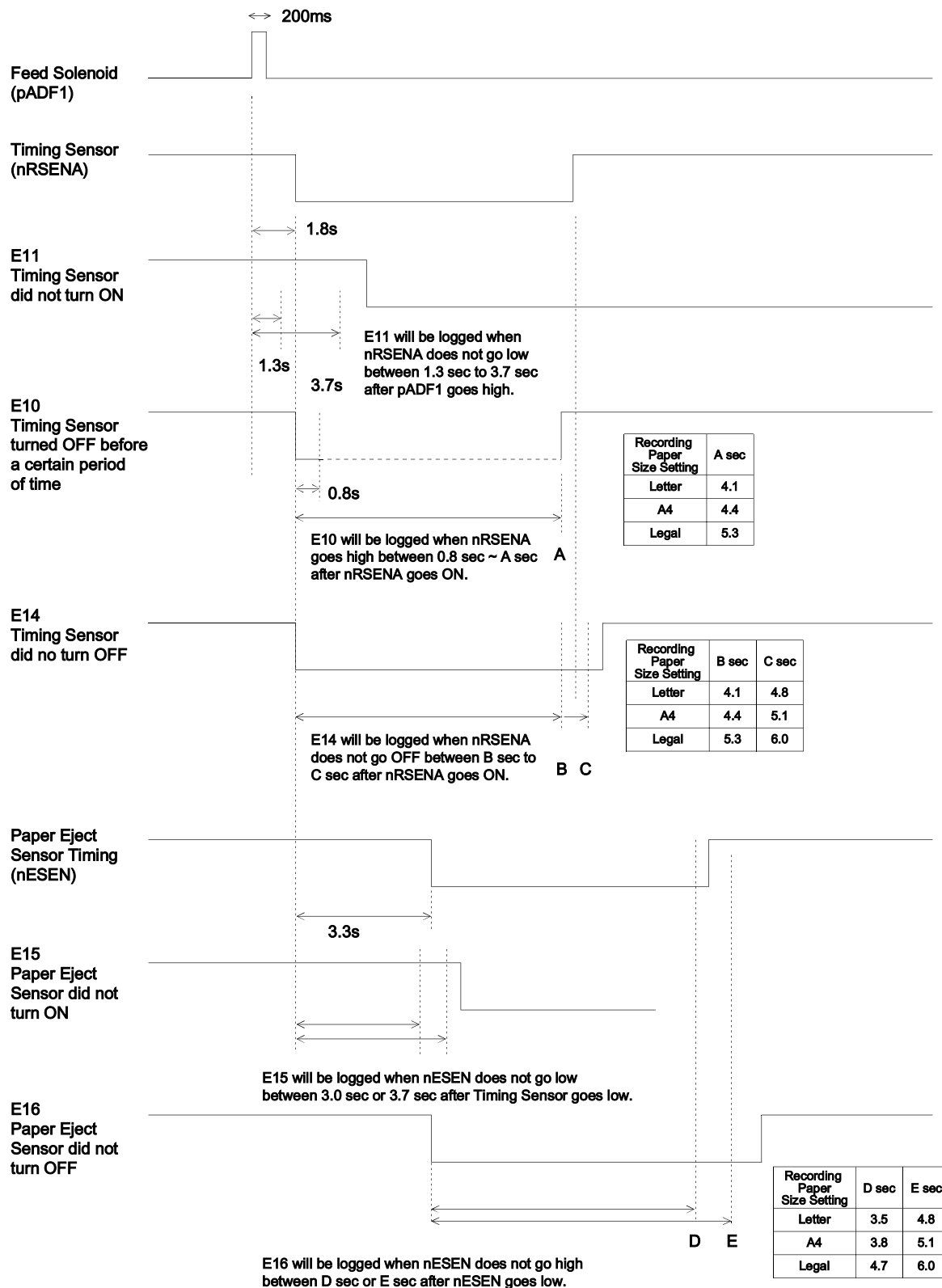
Once activated, this information is downloaded into the LPC PC Board's SRAM, disabling the Fuser Lamp and preventing it from turning ON again.

In order to reset this circuit, please follow the procedure below.

- 1) Reset the LBP Fuser by using Test Mode 7-1-2 (Section 5.6) and Power OFF/ON.
- 2) Replace the Thermistor or Fuser Unit. If the problem persists.
- 3) Replace the LPC PCB.

2. Printer Error Detail Explanation

Recording Paper Jam Detection



The graph illustrates the Fuser Roller Temperature (°C) over Time. The temperature curve starts at 25°C, rises to a peak of 193°C, and then oscillates between 185°C and 193°C. The fan speed is indicated by a dashed line that is 'ON' (high speed) during the initial rise and 'OFF' (low speed) during the oscillations. Various error conditions are triggered based on temperature thresholds and fan speed:

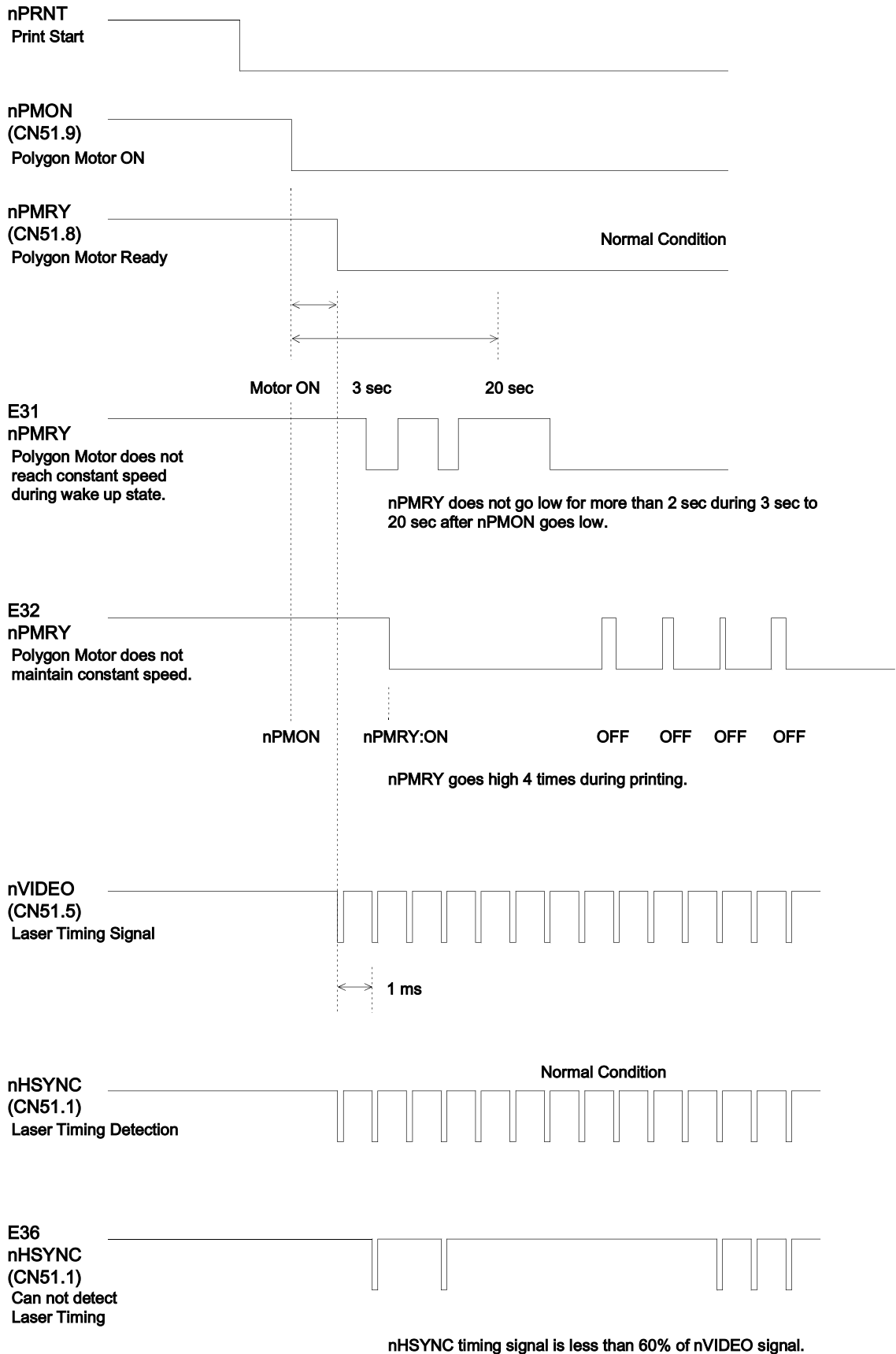
- E22** will be logged when temperature does not rise.
- E23** will be logged if Thermistor detects 197°C or higher for 5 min. after Fuser Lamp is turned Off.
- E24** will be logged if Thermistor detects less than 170°C for 3 sec during the print process.
- E25** will be logged when temperature does not go up at low temperature environment.
- E26** will be logged. (Thermal Fuse will open.)

Additional notes on the graph:

- Fan rotates high speed
- Fan speed rotates slower if Thermistor detects less than 150°C for 60 sec, after Fuser Lamp is turned Off.
- Fan stops if Thermistor detects less than 70°C for 225 sec after Fuser Lamp is turned Off.

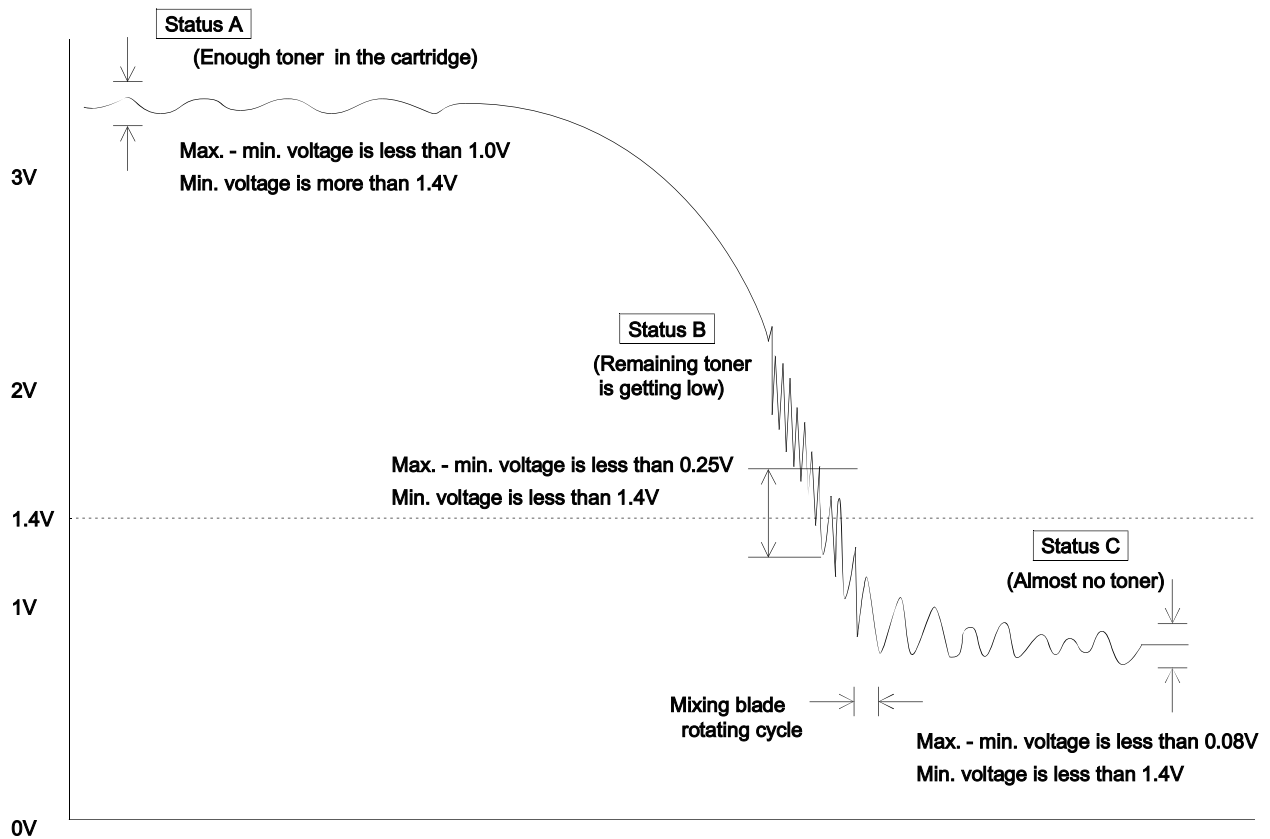
The graph includes a time scale of approximately 30 seconds and a temperature scale from 14°C to 215°C.

LSU Error Detection



Out of Toner Detection

Toner Sensor Output Signal



Toner Sensor output may change when the mixing blade passes above the Toner Sensor. Therefore the output signal has a max. voltage and min. voltage during mixing blade rotation cycle (6 sec).

E043

If the unit detects Status B 10 times during printing, the machine recognizes that the remaining toner is low and the display shows "REPLACE TONER CARTRIDGE".

E041

After detecting E043 and the LBP Print Available Counter Value reaches "0", the unit logs E041 (OUT OF TONER).

E45

If the unit detects Status C when power is On, the unit logs E045 and displays "NO CARTRIDGE". The unit will recover when detecting Status A after a new toner cartridge is installed.

5.3.4 All Document Files

Print the document files from the Flash Memory. (This function will be available as a running change in the future)

Step	Operation or Unit Condition	LCD Display
1	Standby	<div>SEP-12-1999 15:00 00%</div>
2	Press "FUNCTION" and then "7".	<div>SET MODE (1-6) ENTER NO. OR V ^</div>
3	Press "MONITOR" four times, then press "*".	<div>SERVICE MODE ENTER NO. OR V ^</div>
4	Press "3".	<div>PRINTOUT (1-7) 1:FUNC. PARAM. LIST</div>
5	Press "5" and "START".	<div>* PRINTING * ALL DOCUMENT FILES</div>
6	After printing is completed, the unit returns to the display in step 3.	<div>SERVICE MODE ENTER NO. OR V ^</div>
7	Press "STOP" to return to standby.	<div>SEP-12-1999 15:00 00%</div>

5.3.5 Protocol Trace

Print a Protocol Trace Report for the previous communication.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "3".	PRINTOUT (1-7) 1:FUNC. PARAM. LIST
5	Press "6" and "START".	* PRINTING * PROTOCOL TRACE
6	After printing is completed, the unit returns to the display in step 3.	SERVICE MODE ENTER NO. OR V ^
7	Press "STOP" to return to standby.	SEP-12-1999 15:00 00%

```

***** PROTOCOL LOG. REPORT ***** DATE SEP-12-1999 ***** TIME 16:56 *****

STATUS      : OK
MODE        : ECM-TX (STANDARD)
SPEED       : 9600bps OMS/L
REMOTE CAPA. : DIS 00 CR B9 C4 80 12
LOCAL CAPA.  : TSI 2B 2D 20 20 38 37 2B 2B 2B 2B
               39 3E 3E 3E 3E 34 37 38 38 30
               DCS 00 C6 F0 44

COMMAND LOG.
REMOTE      : NSF CSI DIS CPM
LOCAL       : TSI DCS PIX PPS-MOP
-----
REMOTE      : MCF
LOCAL       : DCM

-PANASONIC DX-2000-
*****-PANAFAX DX-2000-*****12345678901234567890*****

```

5.3.6 Toner Cartridge Order Form

The Toner Cartridge Order Form can be printed out manually by the following procedure.

Step	Operation or Unit Condition	LCD Display
1	Standby	<div>SEP-12-1999 15:00 00%</div>
2	Press "FUNCTION" and then "7".	<div>SET MODE (1-6) ENTER NO. OR V ^</div>
3	Press "MONITOR" four times, then press "*".	<div>SERVICE MODE ENTER NO. OR V ^</div>
4	Press "3".	<div>PRINTOUT (1-7) 1:FUNC. PARAM. LIST</div>
5	Press "7" and "START".	<div>* PRINTING * TONER ORDER FORM</div>
6	After printing is completed, the unit returns to the display in step 3.	<div>SERVICE MODE ENTER NO. OR V ^</div>
7	Press "STOP" to return to standby.	<div>SEP-12-1999 15:00 00%</div>

> TONER CARTRIDGE ORDER FORM <

**** The toner supply in your facsimile machine is running low **** (1)
To order a replacement Cartridge from your Authorized Dealer

Panafax Corp. (2)

by Phone: 1 201 111 5555 (3)

by Fax: 1 201 111 4444 (4)

Thank you for your order.

Customer Name and Address
=====

Ship to: _____ Bill to: _____

Attention: _____

Phone No.: _____

Customer ID: ABC COMPANY (5) P.O. No.(if required): _____

Toner Cartridge: UG-3313 (6) Serial No.: _____

Quantity Required:

Print your name and title

Signature & Date

/ /

Explanation of Contents

- (1) Low Toner Message (Fixed)
- (2) Dealer Name
- (3) Toner Order Tel #
- (4) Toner Order Fax #
- (5) Customer ID
- (6) Toner Cartridge No.

"The toner supply in your facsimile machine is running low"
Up to 25 digits
Up to 36 digits
Up to 16 characters (User Identification Code)
UG-3313

5.4 Service Mode 4 (Modem Test)

5.4.1 Binary Signal

This test mode is used to check the binary signal output. Signals can be output to the line using the following procedure.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "4".	MODEM TEST (1-5) 1: SIGNAL TEST
5	Press "START".	SIGNAL TEST IDLE (ENTER 1-9)
6	Enter the signal number (1-9) to select the binary signal.	SIGNAL TEST 300bps
7	Press "CLEAR" to end the signal generation. To select another signal, repeat step 6.	SIGNAL TEST IDLE (ENTER 1-9)
8	Press "STOP" twice to return to standby.	SEP-12-1999 15:00 00%

Binary Signal Table

Number	Signals
1	V21 300bps
2	V27ter 2400bps
3	V27ter 4800bps
4	V29 7200bps
5	V29 9600bps
6	V17 TC7200bps
7	V17 TC9600bps
8	V33 12000bps
9	V33 14400bps

5.4.2 Tonal Signal

This test mode is used to check the tonal signal output. Signals can be output to the line using the following procedure.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "4".	MODEM TEST (1-5) 1: SIGNAL TEST
5	Press "2" and "START".	TONAL TEST IDLE (ENTER 1-7)
6	Enter the signal number (1-7) to select the binary signal.	TONAL TEST 1080Hz
7	Press "CLEAR" to end the signal generation. To select another signal, repeat step 6.	TONAL TEST IDLE (ENTER 1-7)
8	Press "STOP" twice to return to standby.	SEP-12-1999 15:00 00%

Tonal Signal Table

Number	Signals
1	462 Hz
2	1080 Hz
3	1100 Hz
4	1300 Hz
5	1650 Hz
6	1850 Hz
7	2100 Hz

5.4.3 DTMF Signal

This test mode is used to check the DTMF (Dual Tone Multi Frequency) signal output. The DTMF signal can be generated using the following procedure.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "4".	MODEM TEST (1-5) 1: SIGNAL TEST
5	Press "3" and "START".	DTMF TEST (1-2) 1. SINGLE
6a	Press "START" for DTMF Single Tone Generation.	SINGLE TONE ENTER (1-8)
7a	Enter the signal number (1-8) to select the DTMF signal.	SINGLE TONE 697Hz
6b	Press "2" and "START" for Dual Tone Generation.	DUAL TONE ENTER (0-#)
7b	Enter the signal number (0-#) to select the DTMF Dual tone.	DUAL TONE (0)
8	Press "CLEAR" to end the signal generation. To select another signal, repeat step 7a or 7b.	SINGLE TONE ENTER (1-8)
9	Press "STOP" twice to return to standby.	SEP-12-1999 15:00 00%

DTMF Single Tone Table

Number	DTMF Signal Tones
1	697 Hz
2	770 Hz
3	852 Hz
4	941 Hz
5	1209 Hz
6	1336 Hz
7	1477 Hz
8	1633 Hz

DTMF Dual Tone Table

Number	DTMF Dual Tones
0	941 Hz + 1336 Hz
1	697 Hz + 1209 Hz
2	697 Hz + 1336 Hz
3	697 Hz + 1477 Hz
4	770 Hz + 1209 Hz
5	770 Hz + 1336 Hz
6	770 Hz + 1477 Hz
7	852 Hz + 1209 Hz
8	852 Hz + 1336 Hz
9	852 Hz + 1477 Hz
*	941 Hz + 1209 Hz
#	941 Hz + 1477 Hz

5.4.4 Binary Signal (V.34)

This test mode is used to check the binary signal output. Signals can be output to the line using the following procedure. (V.34)

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "4".	MODEM TEST (1-5) 1: SIGNAL TEST
5	Press "5" and "START".	V.34 MODEM TEST ENTER NO. _
6	Enter the signal number (01-61) and press [SET] to select the binary signal.	V.34 MODEM TEST V34 2400sr 2400bps
7	Press "CLEAR" to end the signal generation. To select another signal, repeat step 6.	V.34 MODEM TEST ENTER NO. _
8	Press "STOP" twice to return to standby.	SEP-12-1999 15:00 00%

Binary Signal Table

Number	Signals	Number	Signals	Number	Signals
01	V34 2400 sr 2400 bps	22	V34 3000 sr 9600 bps	43	V34 3429 sr 4800 bps
02	V34 2400 sr 4800 bps	23	V34 3000 sr 12000 bps	44	V34 3429 sr 7200 bps
03	V34 2400 sr 7200 bps	24	V34 3000 sr 14400 bps	45	V34 3429 sr 9600 bps
04	V34 2400 sr 9600 bps	25	V34 3000 sr 16800 bps	46	V34 3429 sr 12000 bps
05	V34 2400 sr 12000 bps	26	V34 3000 sr 19200 bps	47	V34 3429 sr 14400 bps
06	V34 2400 sr 14400 bps	27	V34 3000 sr 21600 bps	48	V34 3429 sr 16800 bps
07	V34 2400 sr 16800 bps	28	V34 3000 sr 24000 bps	49	V34 3429 sr 19200 bps
08	V34 2400 sr 19200 bps	29	V34 3000 sr 26400 bps	50	V34 3429 sr 21600 bps
09	V34 2400 sr 21600 bps	30	V34 3000 sr 28800 bps	51	V34 3429 sr 24000 bps
10	V34 2800 sr 4800 bps	31	V34 3200 sr 4800 bps	52	V34 3429 sr 26400 bps
11	V34 2800 sr 7200 bps	32	V34 3200 sr 7200 bps	53	V34 3429 sr 28800 bps
12	V34 2800 sr 9600 bps	33	V34 3200 sr 9600 bps	54	V34 3429 sr 31200 bps
13	V34 2800 sr 12000 bps	34	V34 3200 sr 12000 bps	55	V34 3429 sr 33600 bps
14	V34 2800 sr 14400 bps	35	V34 3200 sr 14400 bps	56	ANSam
15	V34 2800 sr 16800 bps	36	V34 3200 sr 16800 bps	57	CM
16	V34 2800 sr 19200 bps	37	V34 3200 sr 19200 bps	58	JM
17	V34 2800 sr 21600 bps	38	V34 3200 sr 21600 bps	59	INFO0c & TONEB
18	V34 2800 sr 24000 bps	39	V34 3200 sr 24000 bps	60	INFO0c & TONEA
19	V34 2800 sr 26400 bps	40	V34 3200 sr 26400 bps	61	PPh & AC & ALT
20	V34 3000 sr 4800 bps	41	V34 3200 sr 28800 bps		
21	V34 3000 sr 7200 bps	42	V34 3200 sr 31200 bps		

5.5 Service Mode 5 (Diagnostic)

5.5.1 CCD Test

This test is used to check the CCD.

Use the following procedure to initiate the test.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "5".	DIAGNOSTIC (1-3) 1:CCD TEST
5	Press "START". The scanner will be active.	1:CCD TEST * CHECK NOW *
6	Press "STOP".	SERVICE MODE ENTER NO. OR V ^
7	Press "STOP" to return to standby.	SEP-12-1999 15:00 00%

**This test is used to check the LCD and LEDs.
Use the following procedure to initiate the test.**

Use the following procedure to initiate the test.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "5".	DIAGNOSTIC (1-3) 1:CCD TEST
5	Press "2" and "START". 1) LCDs display as shown at right. 2) All LEDs will light.	2:LCD/LED TEST * CHECK NOW *
		■■■■■■■■■■■■■■■■■■■■ ■■■■■■■■■■■■■■■■■■■■
6	Press "STOP".	SERVICE MODE ENTER NO. OR V ^
7	Press "STOP" to return to standby.	SEP-12-1999 15:00 00%

5.6 Service Mode 6 (RAM Initialization)

Initializes RAM and restores the Function Parameters to their default values.

Note: This operation should be performed when the unit is first installed.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "6".	* RAM INITIALIZE * ENTER NO. OR V ^
5	Press "v" or "^" to select the initialization mode. (See Note)	* RAM INITIALIZE * LOGO/ID/PSWD CLEAR
6	Press "START".	LOGO/ID/PSWD CLEAR * COMPLETED *
7	Return to step 3 and press "STOP" to return to standby.	SEP-12-1999 15:00 00%

RAM Initialization Table

No.	Initialize Mode	Description
99	SHIPMENT SET (A)	Deletes all setting information, except parameter number 80 and 81, then set default values.
98	SHIPMENT SET (B)	Deletes all setting information, except parameter number 61, 80 and 81, then set default values.
97	FLASH MEMORY CLEAR	Deletes all information in the Flash Memory.
1#	MANUFACTURE SET	Factory use only. DO NOT USE IN THE FIELD.
16	LBP ERROR LOG CLEAR	Clears the Printer Error Log.
15	LOGO/ID/PSWD CLEAR	Clears the Logo, ID, Polling Password.
14	ALL JOB CLEAR	Clears all Jobs stored in Flash Memory.
13	PROGRAM DIAL CLEAR	Clears the Program keys.
12	ABBR. DIAL CLEAR	Clears the One-touch and ABBR Numbers.
11	JOURNAL CLEAR	Clears the Journal contents.
*	PARAMETER INITIALIZE	Restores the Fax and Function Parameters to default values.

5.7 Service Mode 7 (LBP Service Mode)

This test mode is used to change printer parameters and verify printer information. Use the following procedure to change printer parameter.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "*".	SERVICE MODE ENTER NO. OR V ^
4	Press "7".	LP SERVICE MODE (1-2) 1:LBP PARAMETER SET
5	Press "START" for printer parameter settings. Press "2" and "START" to get the printer information. Ex: Enter "START" for printer parameter settings.	LBP PARAMETER SET 1.PRINTER COUNTER
6	Press "3" and "START". Then enter the number of pages. Ex: Enter "50" and "START".	LBP PARAMETER SET 3.OUT OF TONER
7	Repeat step 5 through 6 to request operation, or press "STOP" to return to standby.	SEP-12-1999 15:00 00%

Sub-Code	Parameter Name	Description
1	1 Printer Counter	Displays and resets the printer and cassette(s) counters.
	2 LBP Fuser Reset	Clears the LBP fuser error.
	3 Out of Toner	Sets the number of pages to print after low toner is detected.
2	V ^ LBP ROM Version	Shows the LBP ROM Version.
	V ^ LBP Print Available	Shows the remaining number of allowable printable pages after low toner has been detected (Counter Only).
	V ^ LBP MEMORY CAPACITY	Shows the page memory capacity.

5.8 Service Mode 8 (Check & Call)

5.8.1 Overview

This feature enables the Authorized Servicing Dealers to manage and improve the Fax machine maintenance to their customers by alerting them of equipment problems. It also can be used as a Supply Sales Tool by alerting the Dealer that the unit is running Low on Toner. The function overview is as follows:

1. The machine's printer error information is stored in the Printer Report.
2. The printer report can be manually printed when required.
3. When printer errors occurs, the unit can automatically transmit the Service Alert Report to the pre-registered telephone number or email address.
4. When the unit detects Low Toner, it can automatically transmit the Maintenance Alert Report to the pre-registered telephone number or email address.
5. When the unit detects Low Toner, it can automatically print out the Toner Order Form with pre-registered order information.

5.8.2 Printer Reports

• Conditions under which a report can be printed or transmitted

1. Manual print

The Printer Report can be printed by Service Mode 3. (See page 200)

2. Automatic transmission/printout

a. Service Alert Report

When the unit detects an Emergency Printer Error, the unit will immediately transmit the Service Alert Report to the pre-registered telephone number or email address. However, the unit will not transmit the Service Alert Report if it finds the same error within the same date in the error log.

b. Maintenance Alert Report

When the unit detects Low Toner, the unit can automatically transmit the Maintenance Alert Report to the pre-registered telephone number or email address. Refer to the Printer Error Code Table.

c. Toner Order Form

When the unit detects Low Toner, the unit can automatically print the Toner Order Form with the pre-registered order information.

Note: The Service and Maintenance Alert Reports are managed in the same manner as the normal memory transmission (Retry, Incomplete, File List, Display while it is transmitting, Journal).

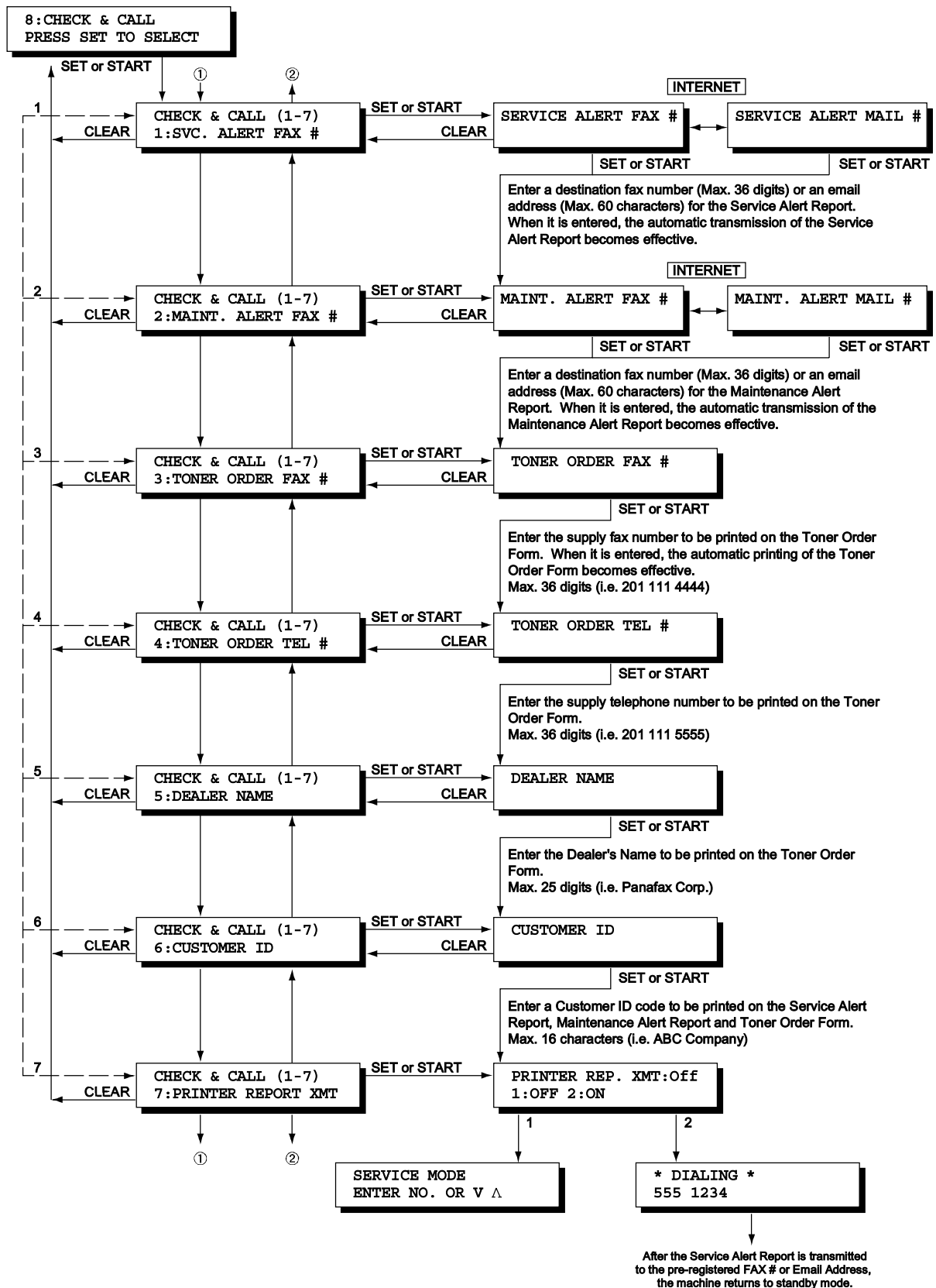
• Printer Error Code Table

Info. Code	Printer Error Code	LED/LCD	Log only	Tx Report	Condition	Content of Error
001	11-13	JAM	o		R/C	Paper Jam 1st, 2nd or 3rd Cassette.
002	14-19	JAM	o		R/C	Paper Exit Error.
010	00	NO PAPER			R/C	No Paper in 1st, 2nd or 3rd Cassette, or wrong Guide Setting.
011	64,65	NO PAPER			S	No 1st, 2nd or 3rd Cassette, or No Paper in 1st, 2nd or 3rd Cassette.
021	22-26,41		o	o	R/C	Fuser Problem / Fan Problem / LP Thermistor disconnected Problem.
041	62	TONER	o		S/R/C	No Toner
043	00	TONER	o	x	S/R/C	Low Toner Warning
045	61	TONER	o		S	No Toner Cartridge
051	00		o	o	S/R/C	Printer Error
054	31,32,36		o	o	R/C	LSU Problem
055	51-55, 58, 81, 00		o	o	S/R/C	No response from LP Controller
060						Rx Door Open
	63	OZONE FILTER			S/R/C	Ozone Filter Replacement Flag detected
870		MEMORY OVERFLOW			T/R	Memory Overflow detected

Note:

1. Transmission Report: o = Service Alert Report, x = Maintenance Alert Report
2. Condition: R = Receive Mode, C = Copy Mode, S = Standby Mode, T = Transmit Mode

5.8.3 Setting Operation



Note**1. Service Alert Report**

To enable the automatic transmission of Service Alert Report, enter the destination fax telephone number or the email address in the "SERVICE ALERT (FAX # or MAIL #)" field. When a printer error occurs, the Service Alert Report is transmitted to the designated number automatically. A blank entry in this field, disables the Automatic transmission of the Service Alert Report.

2. Maintenance Alert Report

To enable the automatic transmission of Maintenance Alert Report, enter the destination fax telephone number or the email address in the "MAINT. ALERT (FAX # or MAIL #)" field. When a printer error occurs, the Maintenance Alert Report is transmitted to the designated number automatically. A blank entry in this field, disables the Automatic transmission of the Maintenance Alert Report.

3. Toner Order Form

To enable the automatic printout of the Toner Order Form, enter the destination fax telephone numbers in the "Toner Order FAX #" field. When a low toner error occurs, the Toner Order Form is printed automatically. A blank entry in this field, disables the automatic printout of the Toner Order Form.

4. SERVICE ALERT FAX #, this would be the fax telephone number for the Dealer's Service Department.

SERVICE ALERT MAIL #, this would be the email address for the Dealer's Service Department.

MAINT. ALERT FAX #, this could be the fax telephone number for the Dealer's Supply Sales Desk.

MAINT. ALERT MAIL #, this could be the email address for the Dealer's Supply Sales Desk.

TONER ORDER FAX #, this could be the fax telephone number for the Dealer's Supply Sales Desk.

TONER ORDER TEL #, this could be the voice telephone number for the Dealer's Supply Sales Desk.

DEALER NAME, this name is printed on the Toner Order Form.

CUSTOMER ID, to identify your customer, enter up to 16 characters user code in this field. This name will be printed on the Service Alert Report, Maintenance Alert Report and Toner Order Form.

5.8.4 SERVICE ALERT REPORT FORMAT

[illegible]

Explanation of Contents

- (1) Date & Time when a problem occurred
- (2) Information Code
- (3) Printer Error Code
- (4) Customer ID
- (5) Fax ROM Version
- (6) LBP ROM Version
- (7) Transmission / Reception / Copy / Print Counters
- (8) Print Error

Refer to Service Manual
Up to 16 characters (User Identification Code)

Last 30 records (Latest on top)

5.8.5 MAINTENANCE ALERT REPORT FORMAT

```
***** DATE SEP-12-1999 ***** TIME 12:14 *****

*****
> MAINTENANCE ALERT REPORT <
*****

LAST PRINT ERROR : MACHINE IS RUNNING OUT OF TONER (1)

CUSTOMER ID      : ABC COMPANY (4)

FAX ROM VERSION  : DX-2000 ALV03000AU (5)
LBP ROM VERSION  : 130003 (6)

TRANSMIT COUNTER : 999999 (7)
RECEIVE COUNTER  : 999999
COPY COUNTER     : 999999
PRINT COUNTER    : 999999

                                -LOGO PANASONIC -

***** -CHARACTER ID - ***** -31415926535897932384-*****
```

Explanation of Contents

- | | |
|--|---|
| (1) Low Toner Message (Fixed) | "MACHINE IS RUNNING OUT TONER" |
| (4) Customer ID | Up to 16 characters (User IdentificationCode) |
| (5) Fax ROM Version | |
| (6) LBP ROM Version | |
| (7) Transmission / Reception / Copy / Print Counters | |

```
*****
> TONER CARTRIDGE ORDER FORM <
*****

**** The toner supply in your facsimile machine is running low **** (1)
To order a replacement Cartridge from your Authorized Dealer

Panafax Corp. (2)

by Phone: 1 201 111 5555 (3)
by Fax:   1 201 111 4444 (4)

Thank you for your order.

Customer Name and Address
=====

Ship to: _____ Bill to: _____
_____
_____

Attention: _____ Attention: _____
Phone No.: _____ Phone No.: _____
Customer ID: ABC COMPANY (5) P.O. No.(if required): _____
Toner Cartridge: UG-3313 (6) Serial No.: _____

Quantity Required:


_____/_____/_____/
Print your name and title Signature & Date
```

Explanation of Contents

- | | |
|-------------------------------|---|
| (1) Low Toner Message (Fixed) | "The toner supply in your facsimile machine is running low" |
| (2) Dealer Name | Up to 25 digits |
| (3) Toner Order Tel # | Up to 36 digits |
| (4) Toner Order Fax # | Up to 16 characters (User Identification Code) |
| (5) Customer ID | |
| (6) Toner Cartridge No. | UG-3313 |

5.9 Service Mode 9 (System Maintenance)

5.9.1 Overview

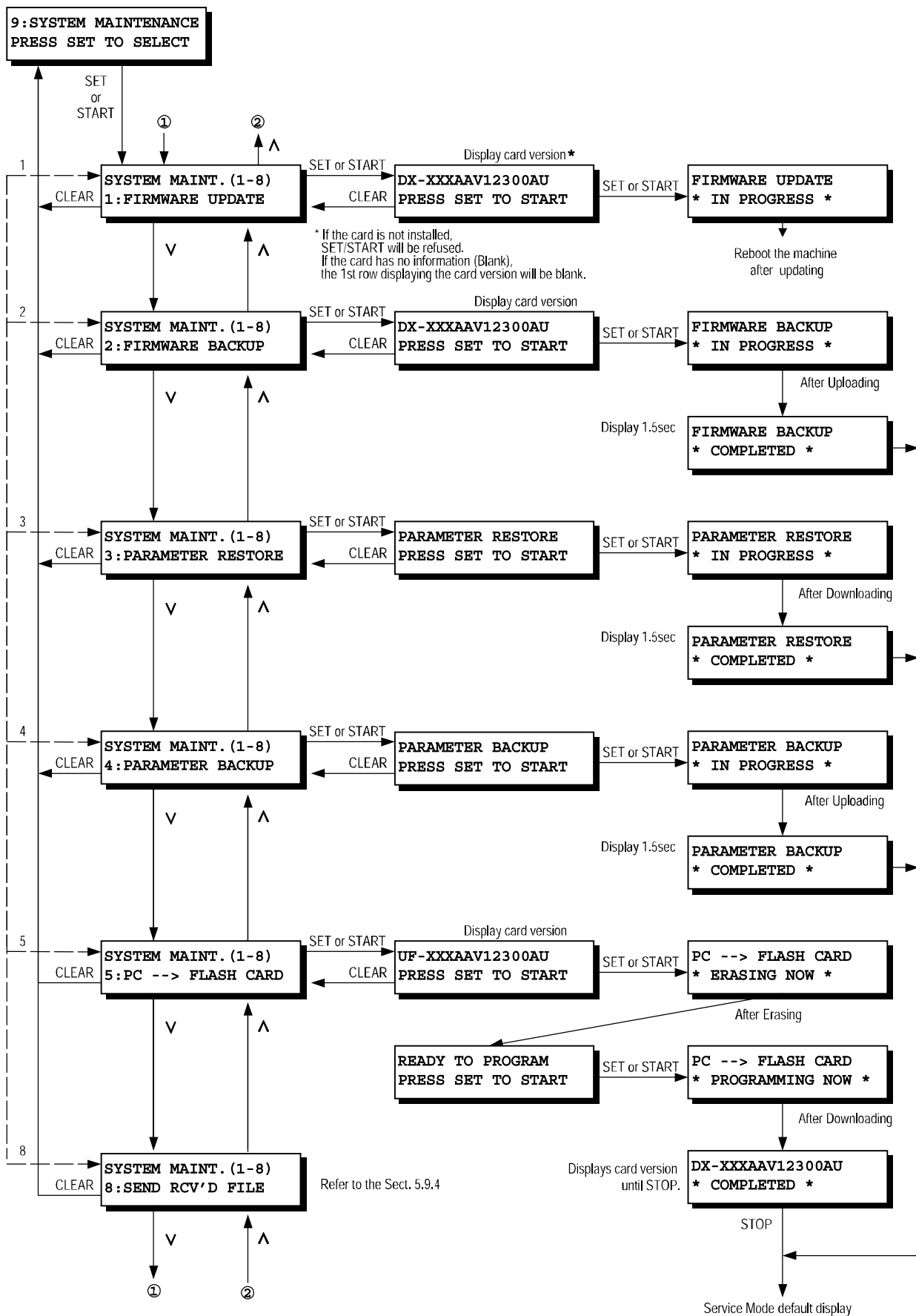
This Service Mode is used to maintain and/or update the firmware of the machine.
Use the following procedure for System Maintenance.

Step	Operation or Unit Condition	LCD Display
1	Standby	SEP-12-1999 15:00 00%
2	Press "FUNCTION" and then "7".	SET MODE (1-6) ENTER NO. OR V ^
3	Press "MONITOR" four times, then press "3".	SERVICE MODE ENTER NO. OR V ^
4	Press "9".	SYSTEM MAINT. (1-8) 1:FIRMWARE UPDATE
5	Press "START" to update the firmware. Enter No. or press "V" or "^" to select the maintenance to be performed. Ex: Enter "2".	SYSTEM MAINT. (1-8) 2:FIRMWARE BACKUP
6	Press "START" and "SET".	FIRMWARE BACKUP * IN PROGRESS *
7	After the backup is completed, repeat step 5 through 6 to request an operation.	SERVICE MODE ENTER NO. OR V ^
8	Press "STOP" to return to standby.	SEP-12-1999 15:00 00%

System Maintenance Table

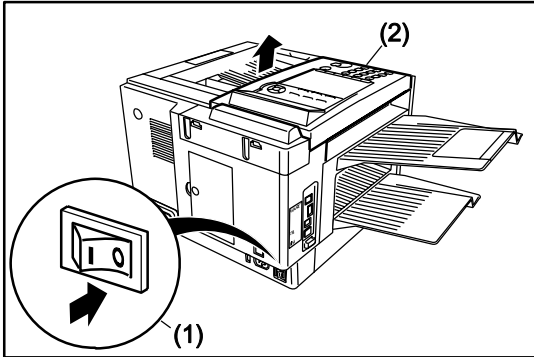
No.	Maintenance Mode	Description
1	FIRMWARE UPDATE	Updates the firmware in the machine with the Master Firmware Card.
2	FIRMWARE BACKUP	Creates a Backup Card of the machine's firmware. (A 2 MB or higher Flash Memory Card is required)
3	PARAMETER RESTORE	Restores the parameters from the Backup Card into the machine.
4	PARAMETER BACKUP	Creates a Backup Card of the machine's parameters. (A 1 MB or higher Flash Memory Card is required)
5	PC → FLASH CARD	Creates a Master Firmware Card using the Firmware Update Kit. (A 2 MB or higher Flash Memory Card is required)
8	SEND RECEIVED FILE	Transfers documents from memory to another fax machine during a fatal printer error.

5.9.2 Operation

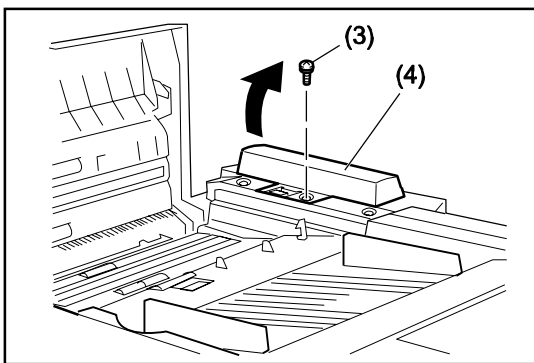


5.9.3 Recovering From Firmware Update Failure

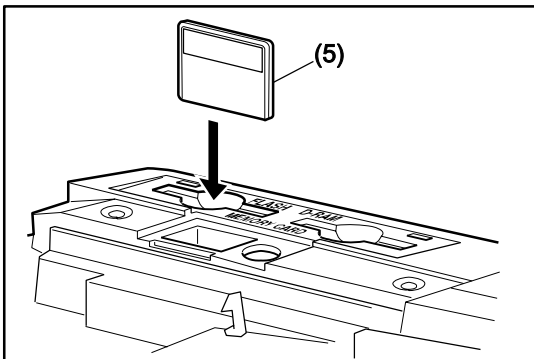
If the Firmware Update is interrupted before completion, the machine will not be able to progress into the Standby Mode and the LCD display will remain Blank. If this happens, please follow the steps described below to recover from a failed firmware update.



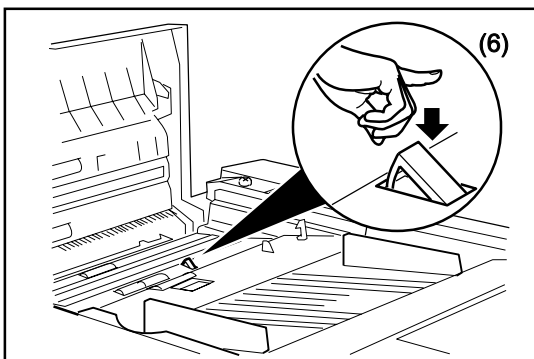
- (1) Turn the **Power Switch** "OFF".
- (2) Open the **Control Panel Unit**.



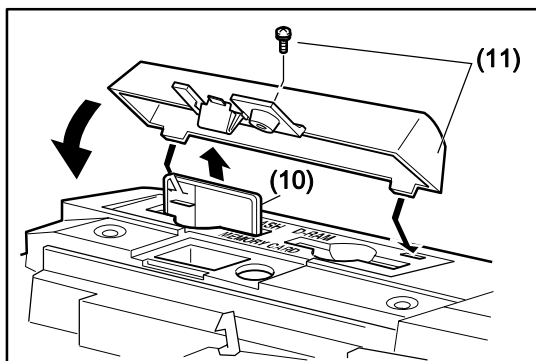
- (3) 1 **Screw (B1)**.
- (4) Remove the **Memory Card Cover (115)**.



- (5) Insert the **Flash Memory Card** with the Firmware Code programmed into the card.



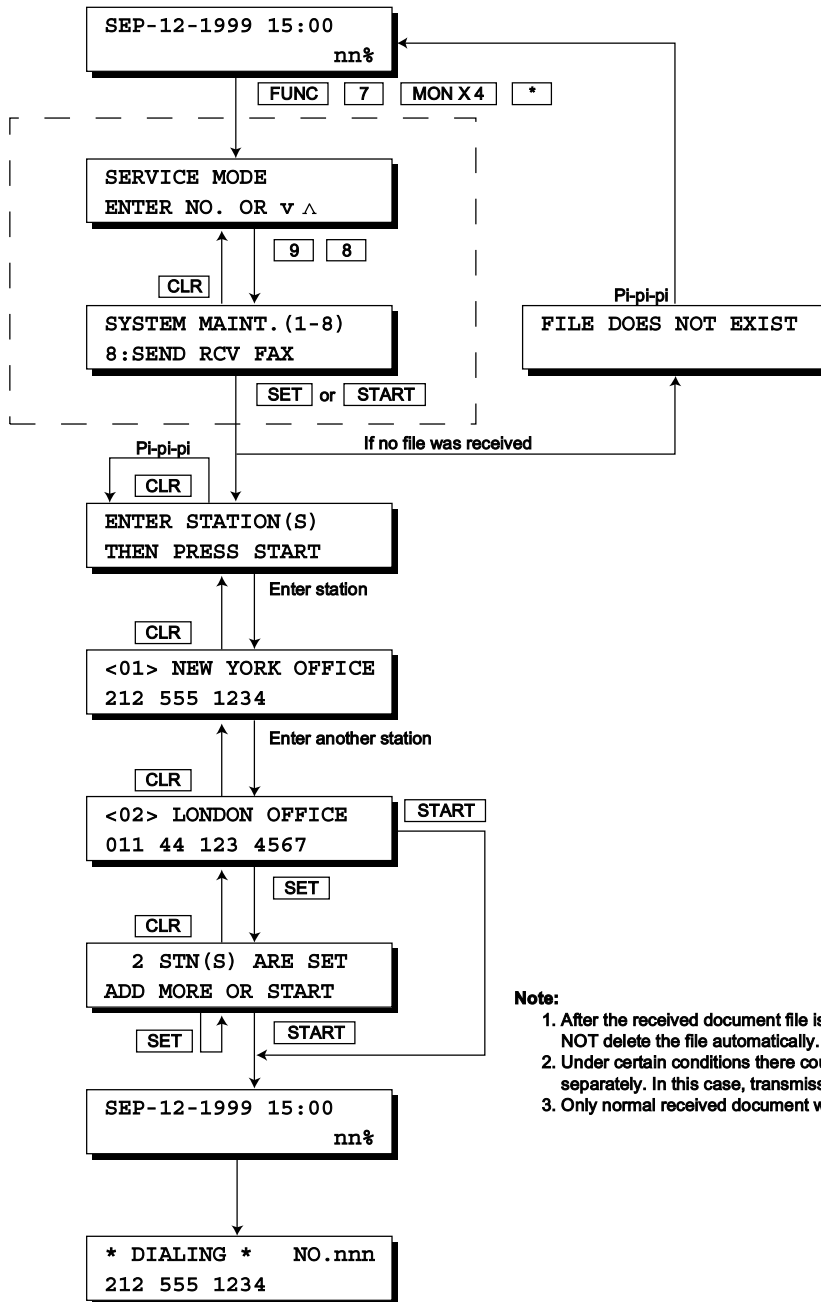
- (6) Activate the **Read Point Sensor** with your finger and turn the **Power Switch** "ON".
- (7) Wait approximately 10 seconds, release the **Read Point Sensor** and close the **Control Panel Unit (ADF)**.
- (8) Allow the unit to complete the Firmware Update (approx. 1-minute). When completed, the unit will reboot and progress to the Standby Mode.



- (9) Turn the **Power Switch "OFF"**.
- (10) Remove the **Flash Memory Card**.
- (11) Re-install the **Memory Card Cover**.
- (12) 1 **Screw (B1)**.
- (13) Close the Control Panel Unit.
- (14) Turn the **Power Switch "ON"**.
- (15) Perform Parameter Initialization.

5.9.4 Send Received File

This function is the relief mode which makes it possible to retrieve memory received documents during a fatal printer error by transferring the documents to another fax machine.



Note:

1. After the received document file is successfully transmitted, unit will NOT delete the file automatically.
2. Under certain conditions there could be two (2) received files stored separately. In this case, transmission will be made separately.
3. Only normal received document will be transmitted.

6 System Description

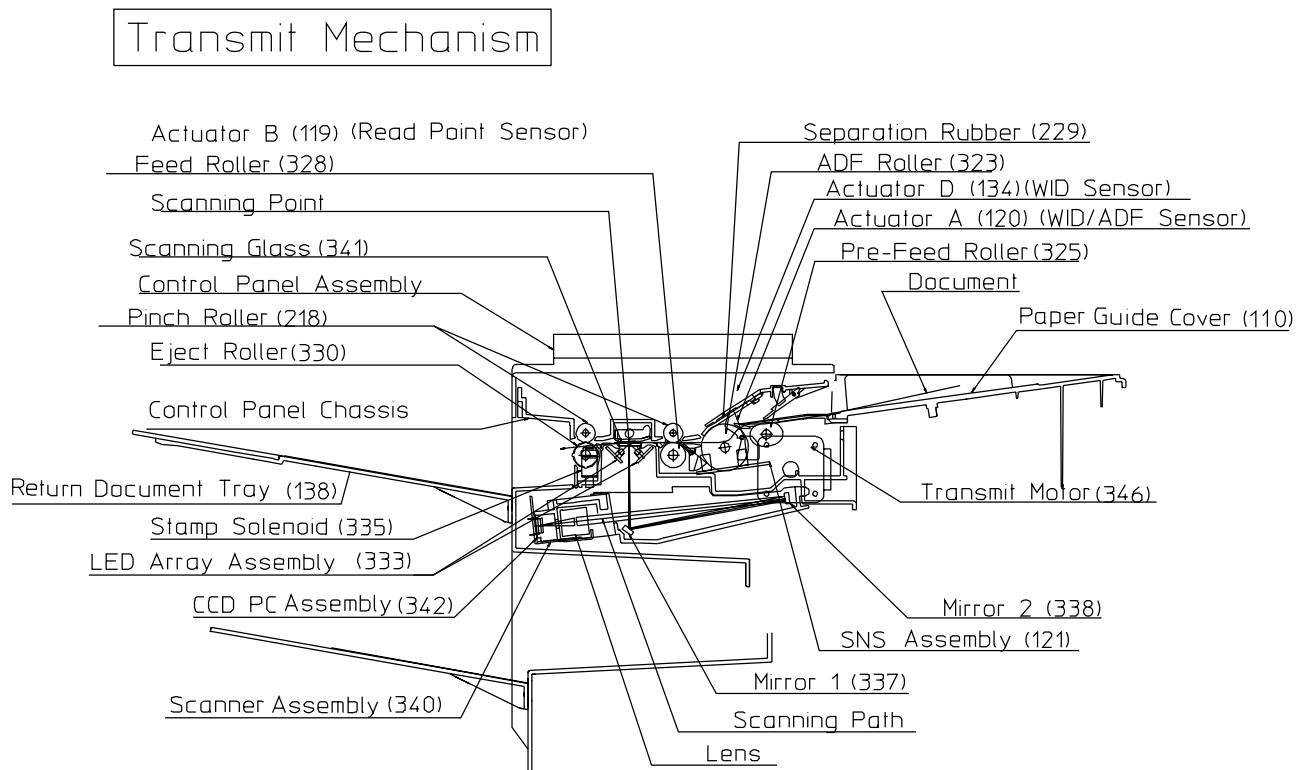
6.1. Mechanical Operation

The mechanical units are installed in a single unit body. The mechanical block consists of the following mechanisms:

Transmit
Mechanism
Receive Mechanism
Covers and Enclosures
Control Panel

6.1.1. Transmit Mechanism

The Transmit Mechanism consists of components which feed, scan and eject documents, as well as send signals. These components and their functions are as follows:



ADF Mechanism

The ADF (Automatic Document Feeder) automatically feeds paper into the unit, and consists of the Pre-Feed Roller, ADF Roller and Separation Rubber. Each document is placed face-down on the Paper Guide Cover before being fed into the unit.

- The **Pre-Feed Roller** (325) moves the bottom document to the ADF Roller.
- The **ADF Roller** (323) feeds individual pages into the scanning area.
- The **Separation Rubber** (229) separates documents placed on the Paper Guide Cover, preventing multiple feeding.

LED Array Assembly

The DX-2000 has two LED Arrays, used as a light source to illuminate the document. The LED Array(s) turns ON when the Read Point Sensor is activated by the document leading edge.

Transmit Guide Unit

The Transmit Guide Unit is an auxiliary part used for feeding and ejecting documents. It consists of the Control Panel Chassis (216), Transmitter Chassis (301), Feed Roller (328), Eject Roller (330), and Pinch Roller (218). This unit also provides the white scanning area and serves as a base for electronic white reference.

- This system feeds documents through the transmitting mechanism, and consists of rollers, gears and a stepper motor.
- The **Transmit Motor** (346), a stepper motor, controlled by the CPU, drives the Pre-Feed Roller, ADF Roller, Feed Roller and Eject Roller, with the speed based on the density of the picture information.
- The **Feed Roller** (328) feeds the document to the scanning point.
- The **Eject Roller** (330) feeds and ejects the document out of the machine.

The **SNS Assembly** (121) performs two functions. The ADF Sensor (PC3), activated by Actuator A (120), detects the presence of documents on the ADF Tray and multiple pages. The WID (A4/B4 size document width) Sensor (PC1), activated by Actuator D (134), detects documents that are wider than 9.1 inches (232 mm). The size of the reproduced copy is reduced when the receiver is capable of printing only letter and A4 size. The size remains the same when the receiver is capable of printing B4 size copies. Width reduction is also in effect in the copy mode.

The **ADF Door Sensor** (PC1), activated by Actuator C (118), halts all scanning operations when the Control Panel Unit is open.

The Verification Stamp Unit stamps an "X" mark on the front of the document after the document is successfully transmitted or stored. It consists of the Stamp Holder (334) and Stamp Solenoid (335).

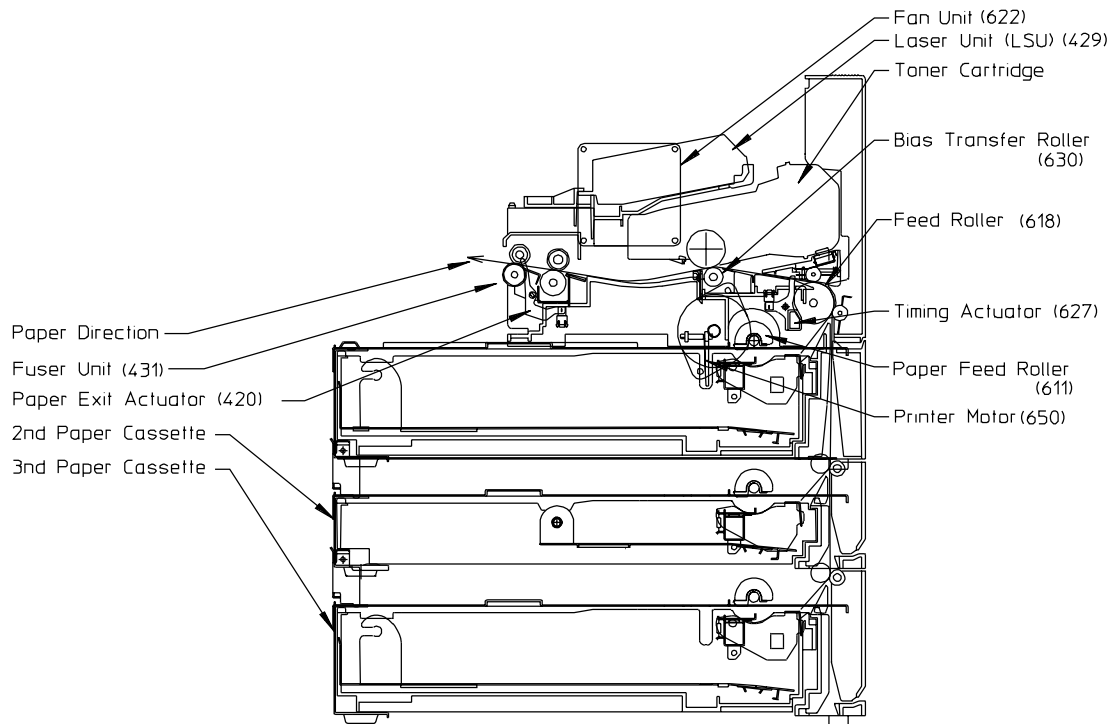
The Scanner Assembly consists of two mirrors, a **Lens**, and a **CCD PC Board Assembly** (342). The mirrors, **Mirror 1** (337) and **Mirror 2** (338) reflect image information, in the form of light, through the Lens. The **Lens** focuses the image information and passes it to the CCD. The **CCD**, mounted on the CCD PC Board, converts the image information into an electronic signal.

The Drive System uses a Planetary Gear System to provide drive to the Pre-Feed Roller and ADF Roller. A planetary gear system does not have a fixed position; it shifts its position according to the rotational torque of the gear, together with the rotation of the planet gear. When the Read Point Sensor is activated, and the document is scanned, the Pre-Feed Roller and the ADF Roller drive are disengaged. The Drive System is shown below.



6.1.2. Receive Mechanism

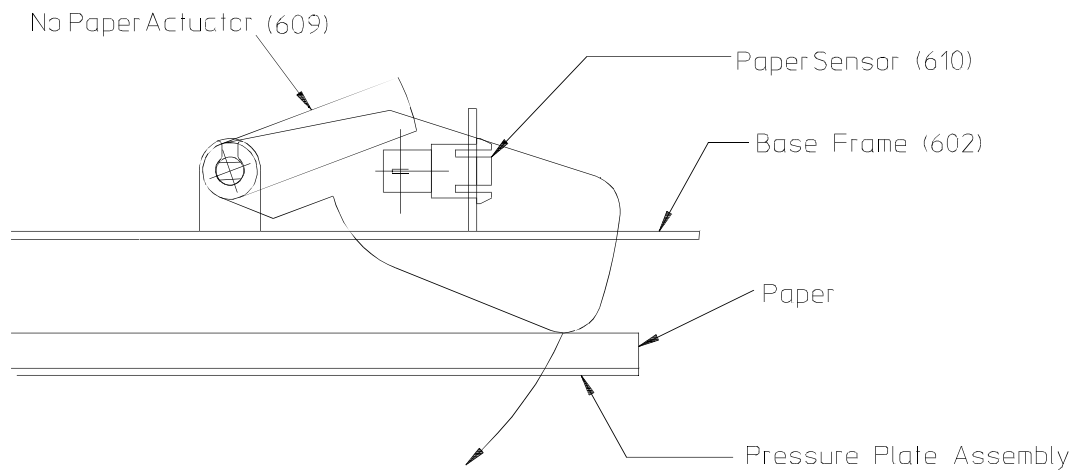
The Receive Mechanism consists of the Laser Unit (LSU), OPC (Organic Photo Conductor) Drum, and various other parts which ensure the normal feeding of recording paper. These components and their functions are as follows:



Paper Feed Units No. 1 and 2

Paper Feeder Unit No. 2 is optional.

Cassette Paper Detection operation



The NP Actuators attached to the Paper Feed Blocks No. 1 and 2 determine if there is paper in the cassette. The paper in the cassette lifts up the NP Actuator, allowing the light from the LED to actuate the phototransistor. The output signal level (nPCHK1 or nPCHK2) is shown in the table below.

	Paper In cassette	No paper
Paper Feed Block No. 1	L	H
Paper Feed Block No. 2	L	H

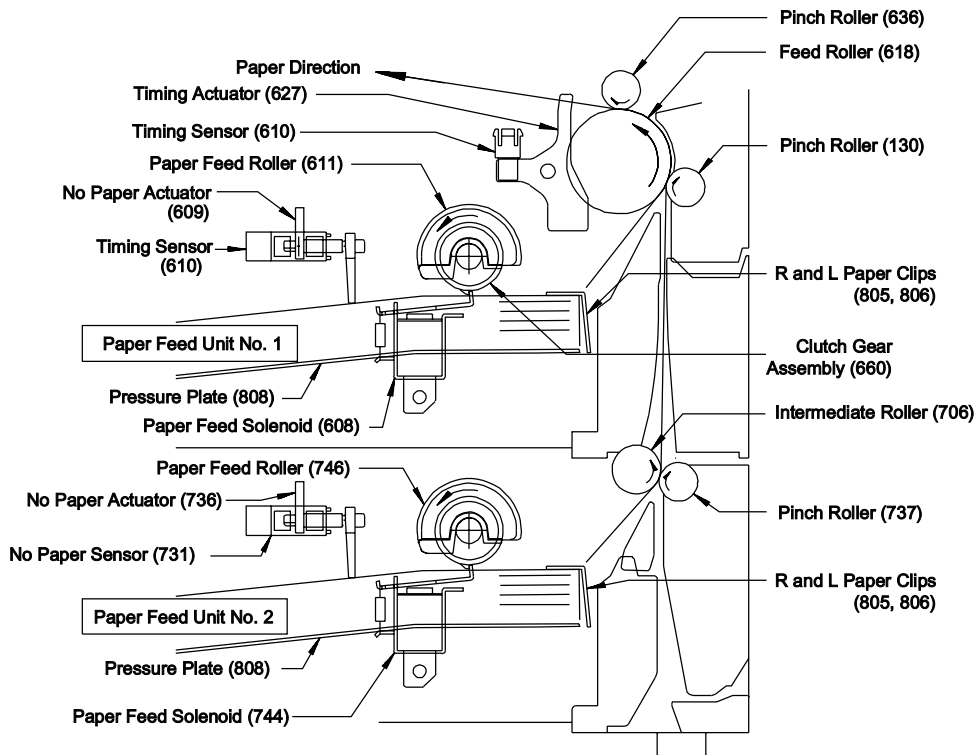
Paper Feed Unit No. 1 Operation

1. The printing operation begins when the nPRT (Print Request) output signal level goes Low. The Printer Motor (650) is initialized.
2. The Paper Feed Solenoid (608) is energized for a specified period of time and turned ON. This activates the Paper Feed Roller (746), which rotates one revolution. The paper is separated into individual sheets by the Paper Separation Arm and transported to the Feed Roller (618).
3. After one revolution the Paper Feed Roller stops, releasing the paper. The Feed Roller transports the paper to the drum area.
4. The actual printing process starts at a specified time after the Timing Actuator (627) is activated and stops at a specified period of time after the trailing edge clears the Timing Actuator.

Paper Feed Unit No. 2 (Optional) Operation

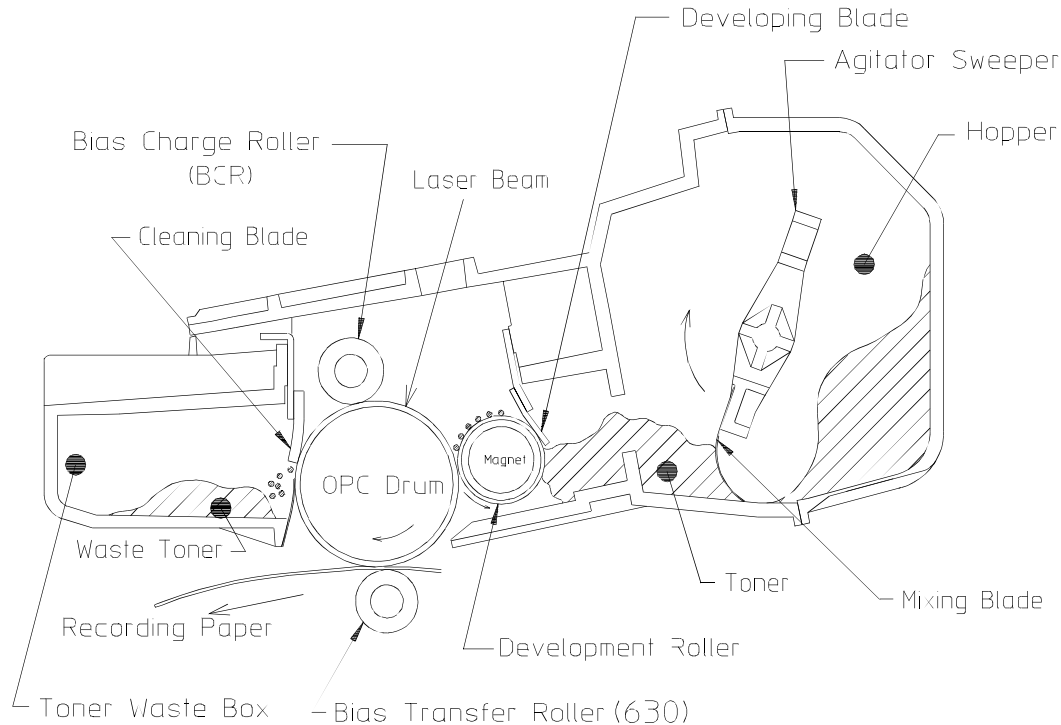
The First Paper Feed Unit always takes priority. The Second Paper Feed Unit becomes operational only when the first cassette runs out of paper and the NP Sensor is deactivated, causing the nPCHK1 output signal level to go High. (See Note)

1. The printing operation begins when the nPRT (Print Request) output signal level goes Low. The Printer Motor (650) is initialized.
2. The Paper Feed Solenoid (744) is energized for a specified period of time and turned ON. This activates the Paper Feed Roller (746), which rotates one revolution. The paper is separated into individual sheets by the Paper Separation Arm and transported to the Intermediate Roller (706).
3. After one revolution the Paper Feed Roller stops, releasing the paper. The Intermediate Roller and the Feed Roller (618) transports the paper to the drum area.
4. The actual printing process starts at a specified time after the Timing Actuator (627) is activated and stops at a specified period of time after the trailing edge clears the Timing Actuator.



Note: The printing priority is always from the 500 sheet Feeder Unit (upper cassette).

6.1.3. Printing Process Operation



Charge

In the dark, the Bias Charge Roller (BCR) applies a high, uniform negative charge to the surface of the OPC Drum. The surface potential is approximately -650 VDC and remains because the drum has a high electric resistance in the dark.

Exposure

A portion of the laser beam is deflected to the timing sensor [Beam Detection (BD) Sensor], which controls the start timing of scanning on the OPC Drum. The CPU also uses the timing sensor to detect abnormal signals. The light beam from the laser diode is modulated by the digital signal (nVIDEO) and converted to parallel light waves by the collimator lens. The beam is then directed to the rotating polygon mirror, where it is reflected to the f- θ lens and then focused onto the OPC Drum surface. The laser beam moves across the surface of the OPC Drum in the scanning direction. Where the laser beam is applied, the negative charge on the drum dissipates, and where the laser is not applied, the negative charge remains. This action forms a latent, electrostatic image on the OPC Drum, corresponding to the original image.

Development

This development process uses a conventional method, where toner coats a Development Roller and transfers to the latent image on the OPC Drum. In the Toner Cartridge, the (mono-component) toner is negatively charged by the friction between the rotating Development Roller (Mag Roller) and the Developing Blade. This combination and the rotation of the Mixing Blade transfers the toner from the reservoir and forms a brush effect on the Mag roller. Where the magnetic brush lightly touches the OPC Drum, the negatively charged toner is attracted to the latent image on the drum, forming a mirror image of the original on the drum. Any remaining toner is removed from the Mag Roller by the Developing Blade and is recycled back into the toner reservoir. A bias voltage of approximately 1.7 kVACp-p at 1.7 kHz, riding on a -500 VDC bias is applied to the magnetic brush to achieve maximum print quality.

Transfer and Separation

As the paper is fed between the OPC Drum and the Bias Transfer Roller (BTR) (630), a positive charge of approximately +600 VDC (+3 μ A steady current) is applied to the backside of the paper by the BTR. The toner particles are attracted away from the drum towards the surface of the paper. During cleaning, the BTR is charged to approximately -800 VDC to repel toner on the OPC Drum and prevent toner from being attracted to the BTR. After transfer has occurred, the paper passes over the Discharge Plate (617) in the Plate Discharge Guide (616), reducing the difference of potential between the OPC Drum and the paper. The stiffness of the paper causes the paper to separate from the drum.

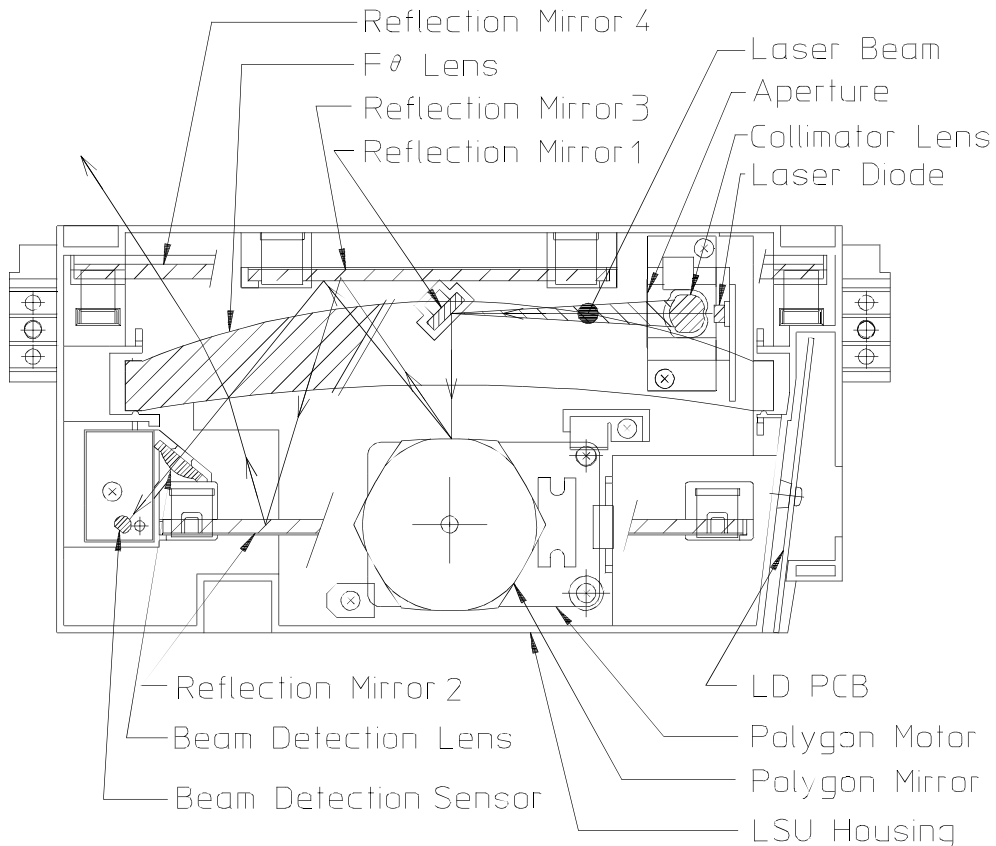
Cleaning

After transfer, some toner may remain on the surface of the OPC Drum. A Cleaning Blade scrapes the OPC Drum surface, and the removed toner is moved into the Toner Waste Box, inside the Toner Cartridge.

Fusing

After separation, the paper passes through the Fuser Rollers and is subjected to heat and pressure in the Fuser Unit (431). Pressure between the Fuser Roller (414) [heated internally by the Fuser Lamp (408) to approximately 190°C (±10°C) (or 374°F)] and Pressure Roller (409) fuses or bonds the toner into the paper.

Laser Unit



Laser

A 5 mW Laser Diode, with a wave length of 780 nm (±20 nm), provides a modulated beam controlled by nVIDEO. The beam power on the drum surface is approximately 0.23 mW, and is controlled by the monitor circuit.

Collimator Lens

This lens converges and focuses the laser beam, converting it to parallel light.

Aperture

This controls the size of the laser beam.

Polygon Mirror and Motor

The polygon scanner consists of a 6-sided mirror, directly driven by a Polygon motor, revolving at 10,000 rpm. The laser beam is reflected against these mirrors and swept over the recorded width in the scanning direction. This unit features a stable line scanning speed, a precision mirror reflection angle, a reflection free surface, and instant start.

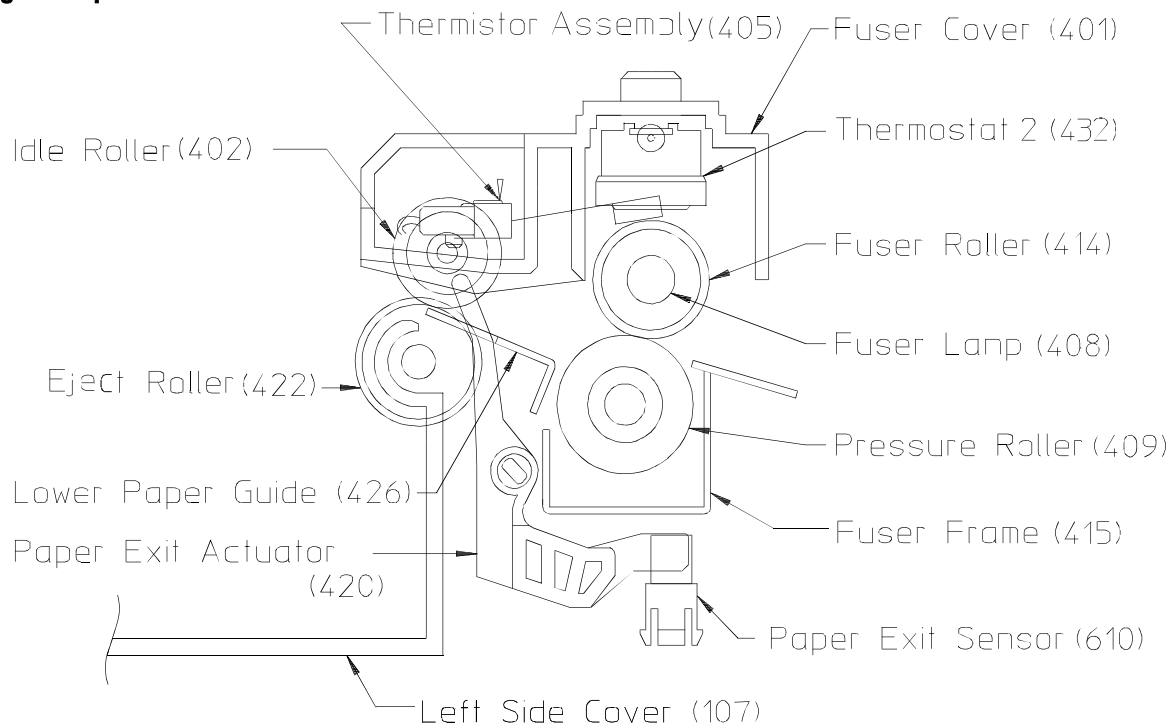
Beam Detection (BD) Lens and Beam Detection (BD) Sensor

The BD Lens receives the reflected light from the Polygon Mirror and redirects it into the BD Sensor, which converts the laser beam into electrical signals and sets the start timing for the scanning line.

f-θ lens

This amorphous plastic, molded lens is designed to provide parallel laser light across the surface of the drum, providing a constant scanning speed.

Fusing and Paper Exit



Fuser Unit (431)

The Fuser Unit, consisting of the Fuser Lamp, Fuser Roller, Pressure Roller, Thermistor, and Thermostat, bonds the toner into the paper using heat and pressure.

Fuser Lamp (408)

Located in the Fuser Roller is a Halogen lamp that serves as the heat source for the Fuser Roller.

Fuser Roller (414)

A Teflon coated roller supplies the heat for bonding the toner to the paper. The temperature of the surface is kept constant at approximately 190°C (±10°C) (or 374°F).

Pressure Roller (409)

This converted PFA tube Silicon Rubber Roller applies pressure to the Fuser Roller, assisting in bonding the toner to the paper.

Thermistor Assembly (405)

The Thermistor, a heat sensitive resistor, in contact with the Fuser Roller, monitors the surface temperature. The temperature detected is used to control the ON/OFF switching of the Fuser Lamp. It also acts as the primary overheating prevention device. A comparator circuit on the FCB PC Board acts as a secondary overheating protection and becomes active at approximately 200°C (392°F).

Thermostat 2 (432)

A Thermostatic Fuse, part of the power line for the Fuser Lamp, provides an extra overheat protection by opening when the Fuser Roller surface temperature reaches 230°C (446°F) and remains there for 1 minute. If the primary and secondary overheat protection does not halt the rise in temperature, the thermostat opens, removing power from the Fuser Lamp. When the Thermostat opens, it must be replaced.

Paper Exit Sensor (610)

This sensor detects the presence of printed paper at the exit. If no paper passes, or if paper is over the sensor too long, a "RECORDING PAPER JAM" message is displayed. When paper passes over the sensor, the output is Low (Low Active).

Thermal Fuse (433)

It is placed in series with the Thermostat on the power line of the Fuser Lamp and performs the tertiary overheating prevention (in case the Thermostat fails) by opening when the surrounding temperature reaches approximately 216°C (420.8°F).

Drive Assembly and Toner Cartridge

The **Drive Assembly**, consisting of the Printer Motor (650) and the drive mechanisms, is activated by coupling and gear arrangements. The **Toner Sensor** (639), a magnetic sensor, detects the remaining quantity of toner in the Toner Cartridge. When the "TONER" lamp starts to blink, there is still enough toner left in the cartridge to print 100 pages (based on ITU-T Image No.1). When toner has run out the display will show: "OUT OF TONER & INFO CODE 041" and the machine is disabled from printing any copies. The **Toner Cartridge** consists of OPC Drum, Bias Charge Roller, Development Roller, Developing Blade, Cleaning Blade, Mixing Blades and Toner Waste Box. The **OPC Drum** is an aluminum cylinder coated with an OPC (Organic Photo Conductor) sensitive material. This surface is photoelectric (retains the charge in the dark and releases the charge in the light). The potential differences on the surface (a static latent image) form a printed image. The **Bias Charge Roller** provides a uniform charge on the OPC Drum surface. The **Development Roller** supplies toner to the drum by rotating over the magnet. The **Developing Blade** evens the toner on the Development Roller surface and also charges the toner by friction. The **Cleaning Blade** cleans by scraping the remaining toner off the OPC Drum surface after transfer.

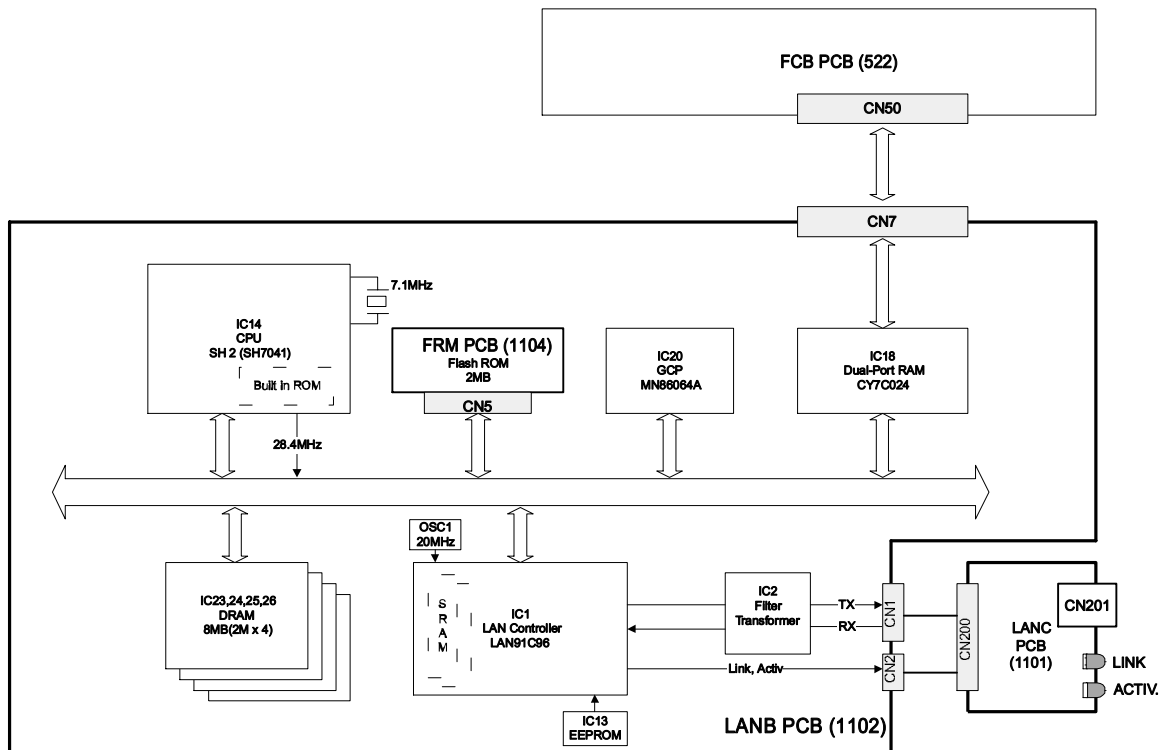
6.1.4. Covers and Enclosures

The Paper Guide Cover (110) contains Paper Guides (111), (112), which adjust to the paper width to properly feed the original documents. The **Front Cover** (105) has a Speaker (133) mounted inside. The **Rear Cover** (108) shields the circuit boards and the **Internet Enclosure** (1503) shields the Internet Interface. The Printer Cover (122) contains the Document Sub Tray (124), used to support legal size documents. The Left Side Cover (107) shields the Fuser Unit.

6.1.5. Control Panel

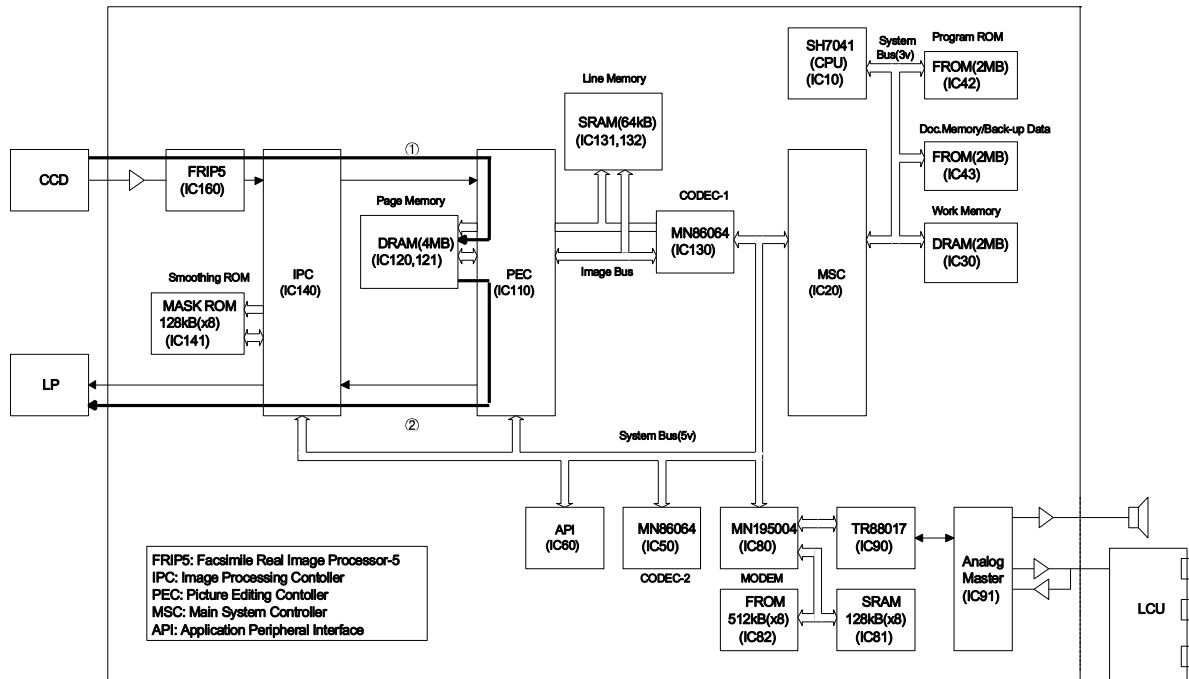
The Control Panel consists of the Panel PC Boards (214) and LCD Unit (215), which displays the various status messages, and a membrane-type panel.

6.2.2. LAN Block Diagram

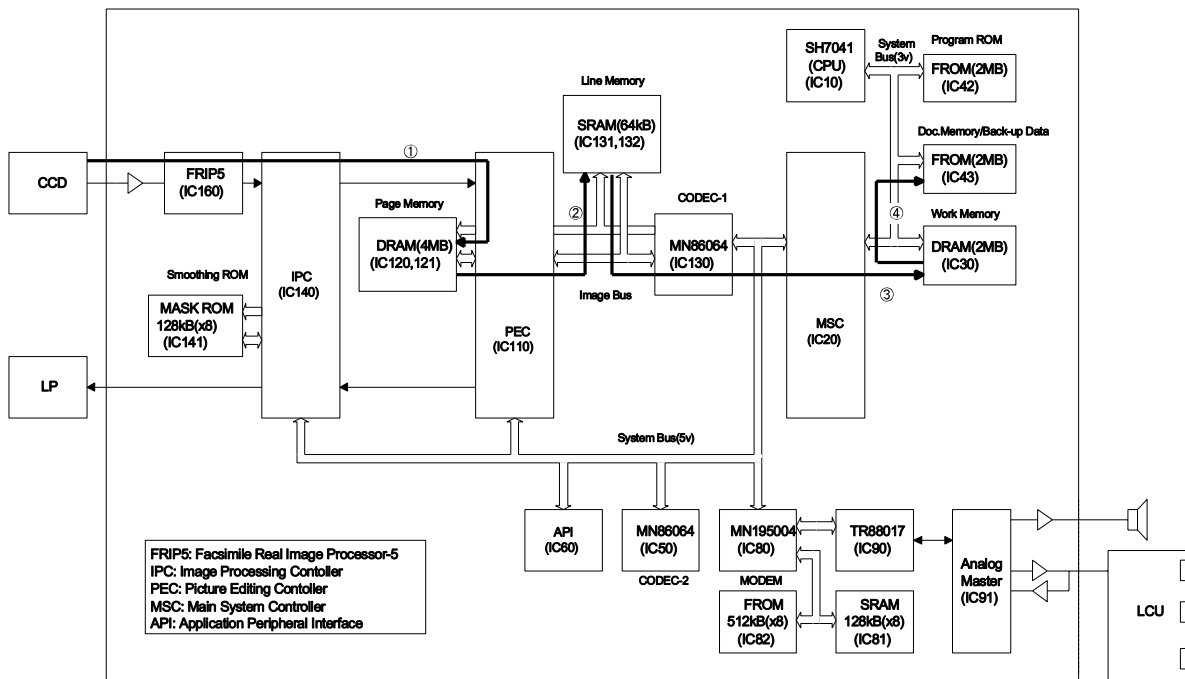


6.2.3. Signal Routing

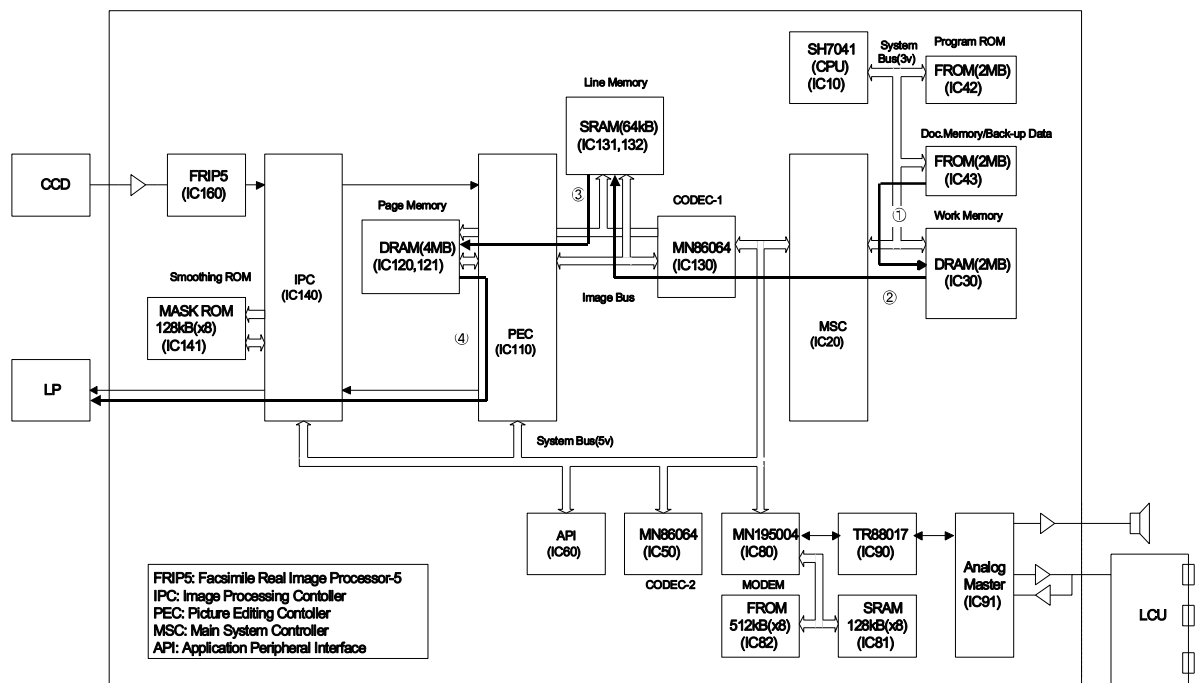
Single Copy



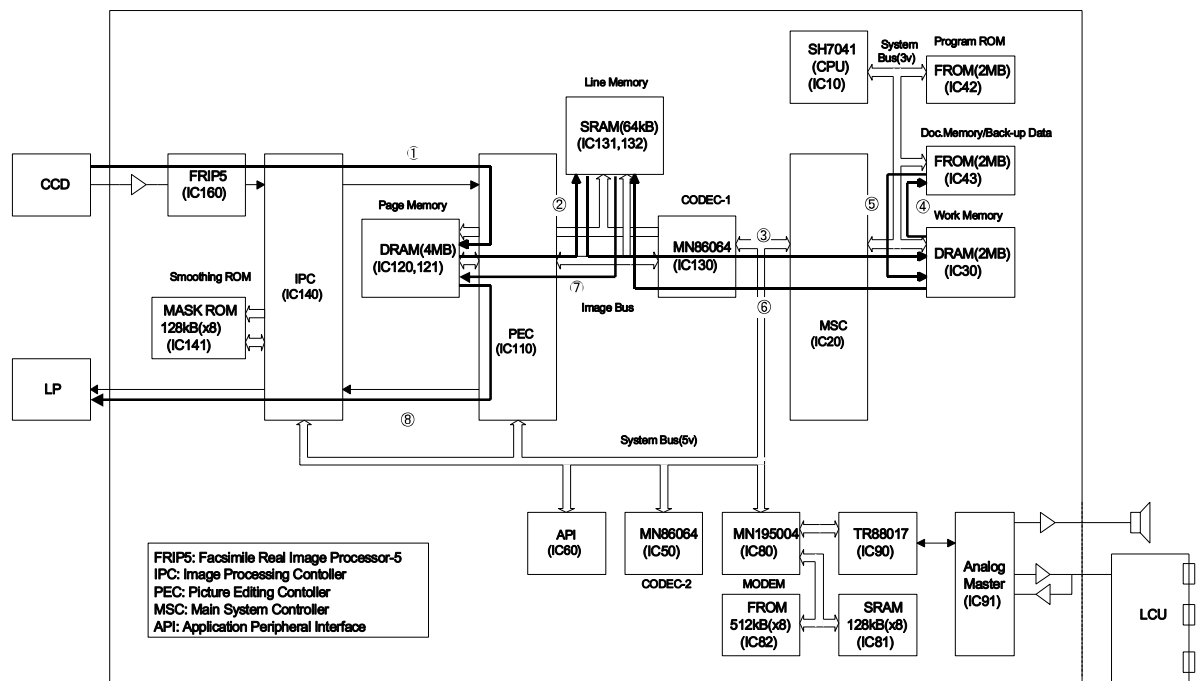
Scan into Memory



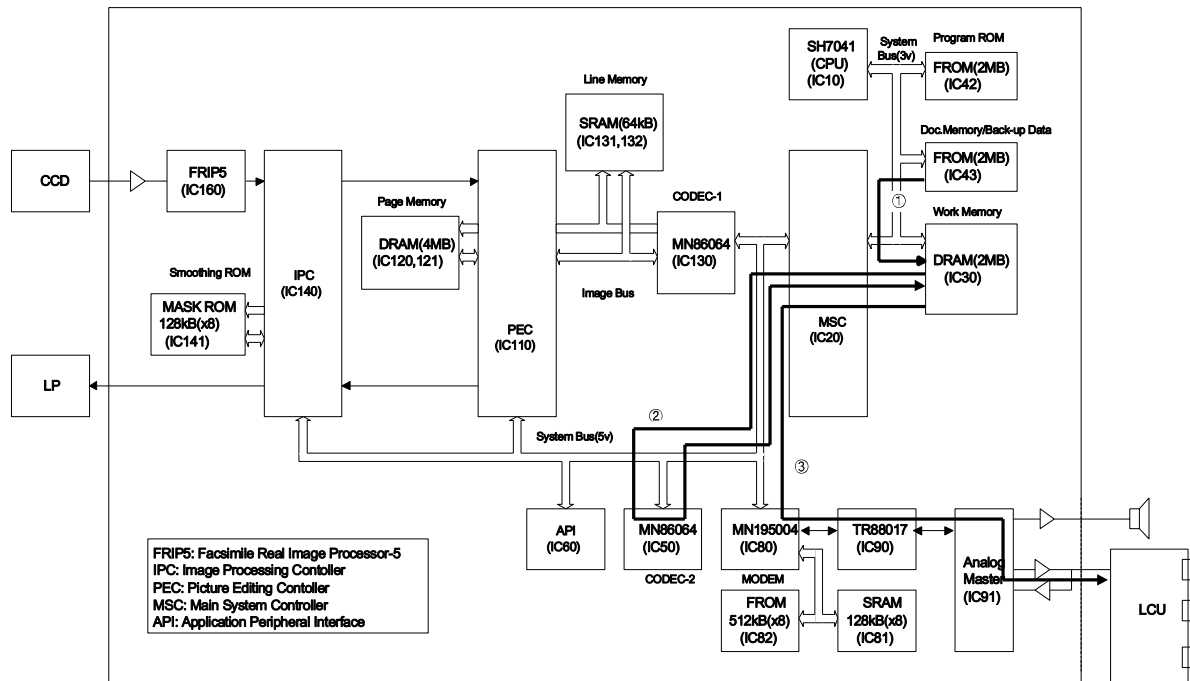
File Print From Memory



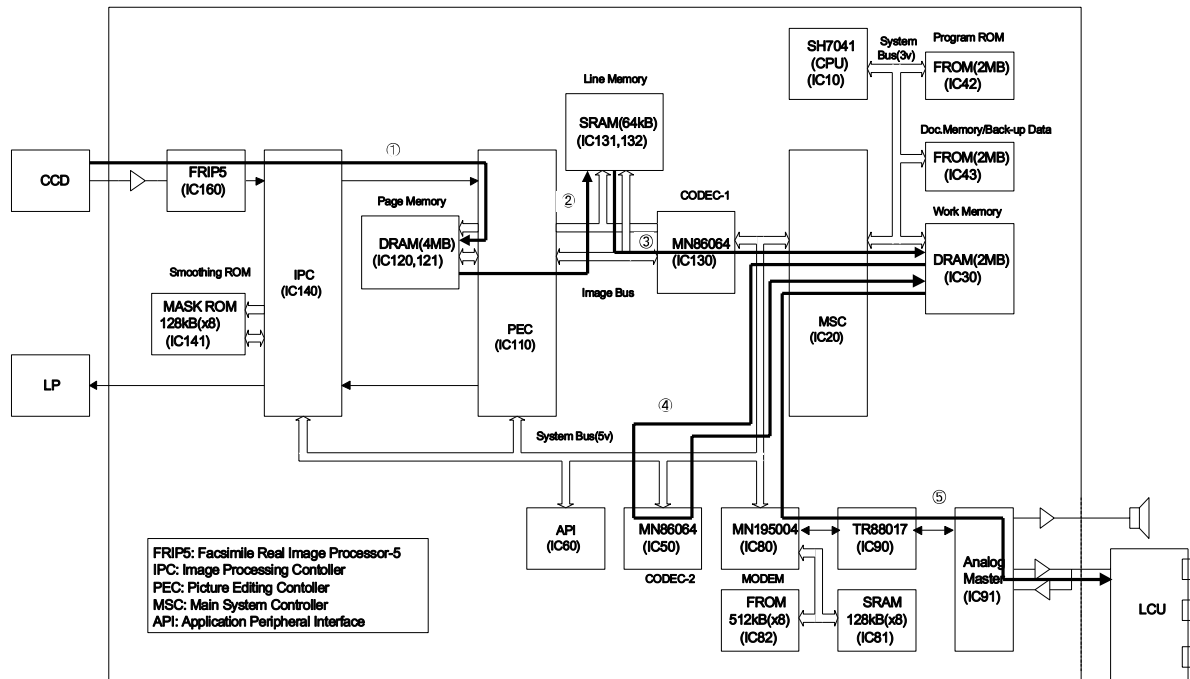
Multiple Copies



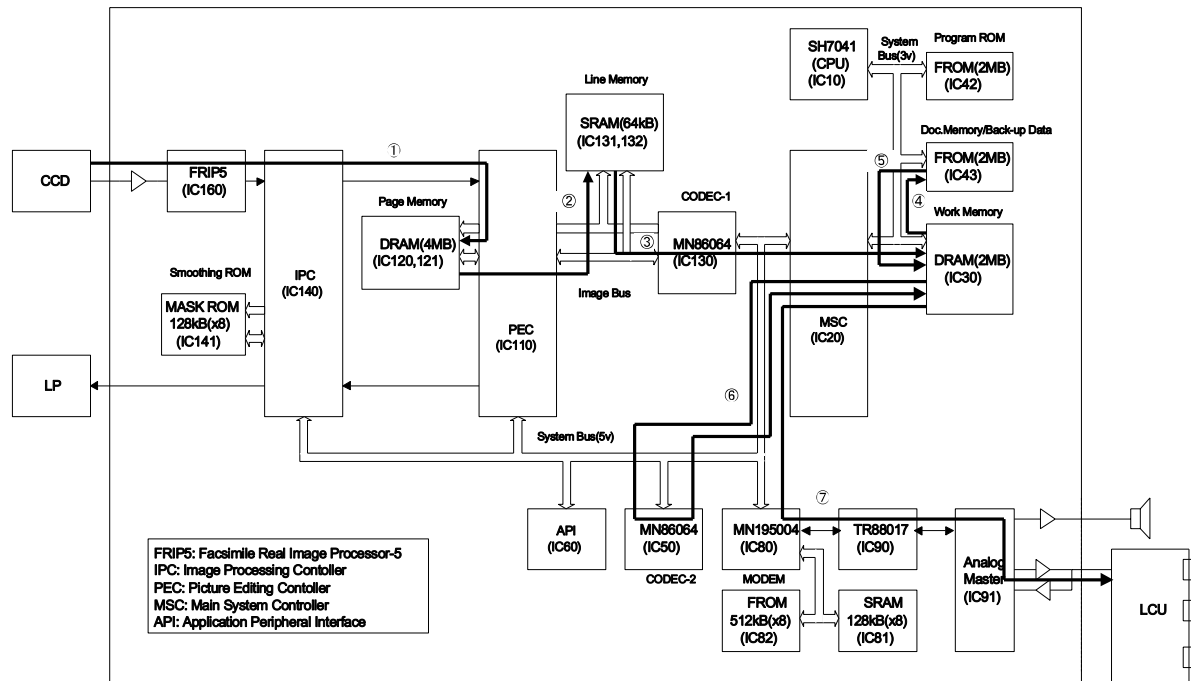
Memory Transmission (FAX)



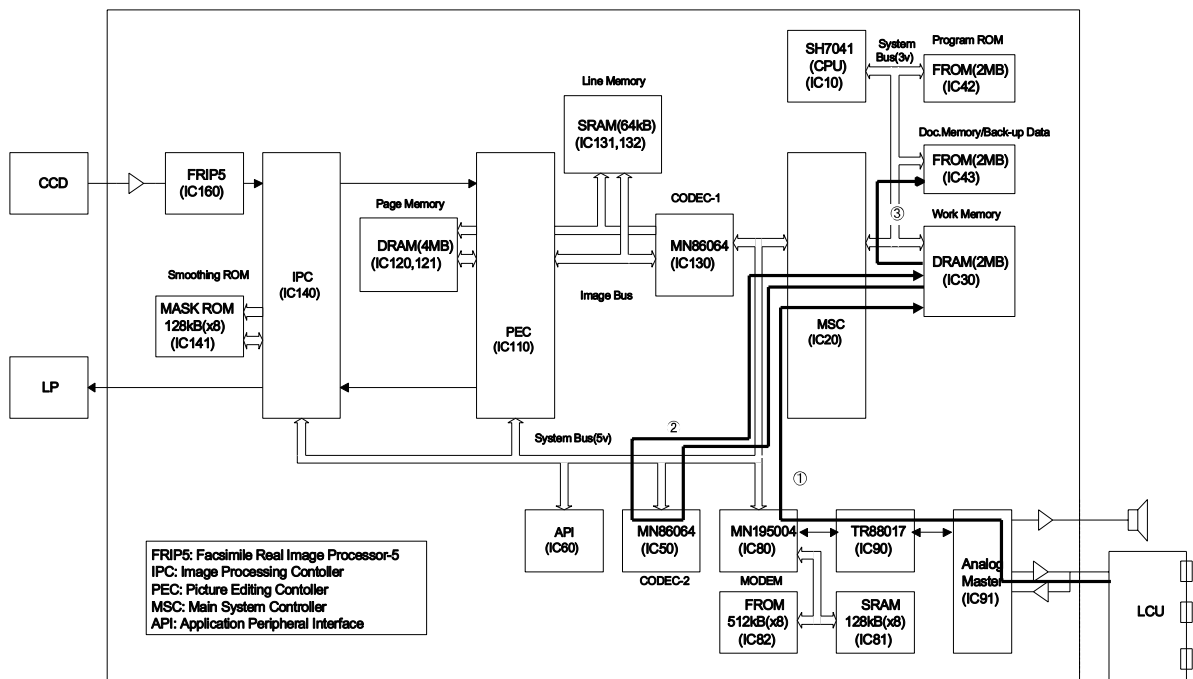
ADF Transmission



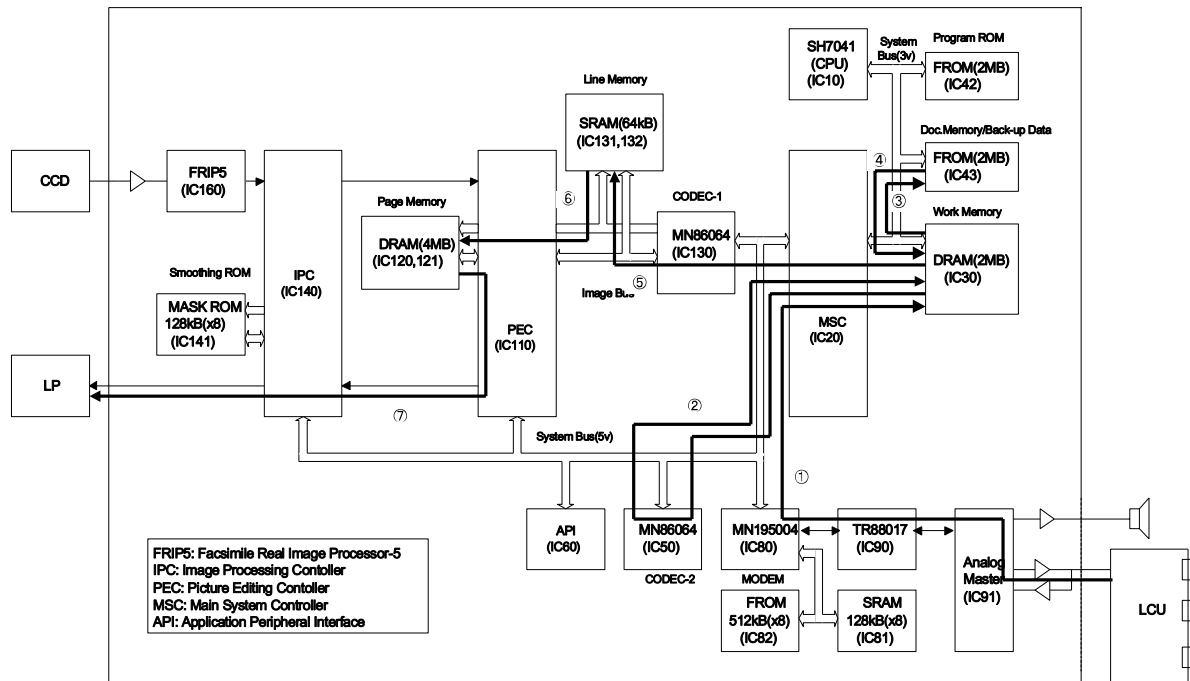
Quick-Scanning Transmission (FAX)



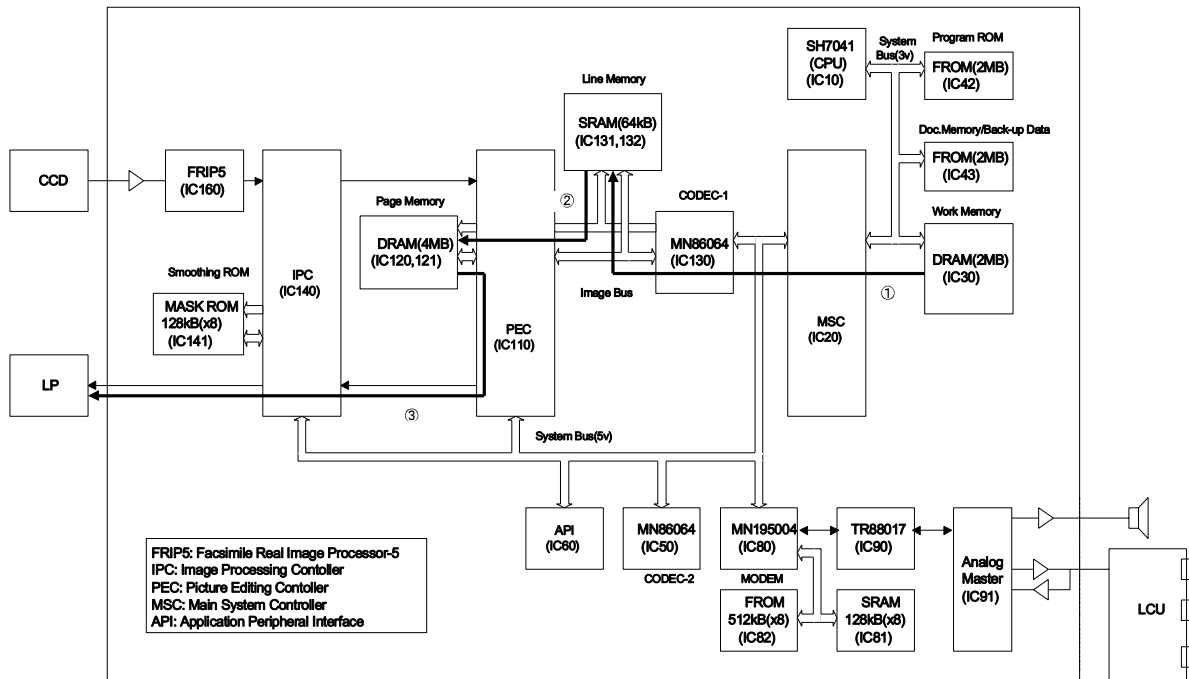
Memory Reception (FAX)



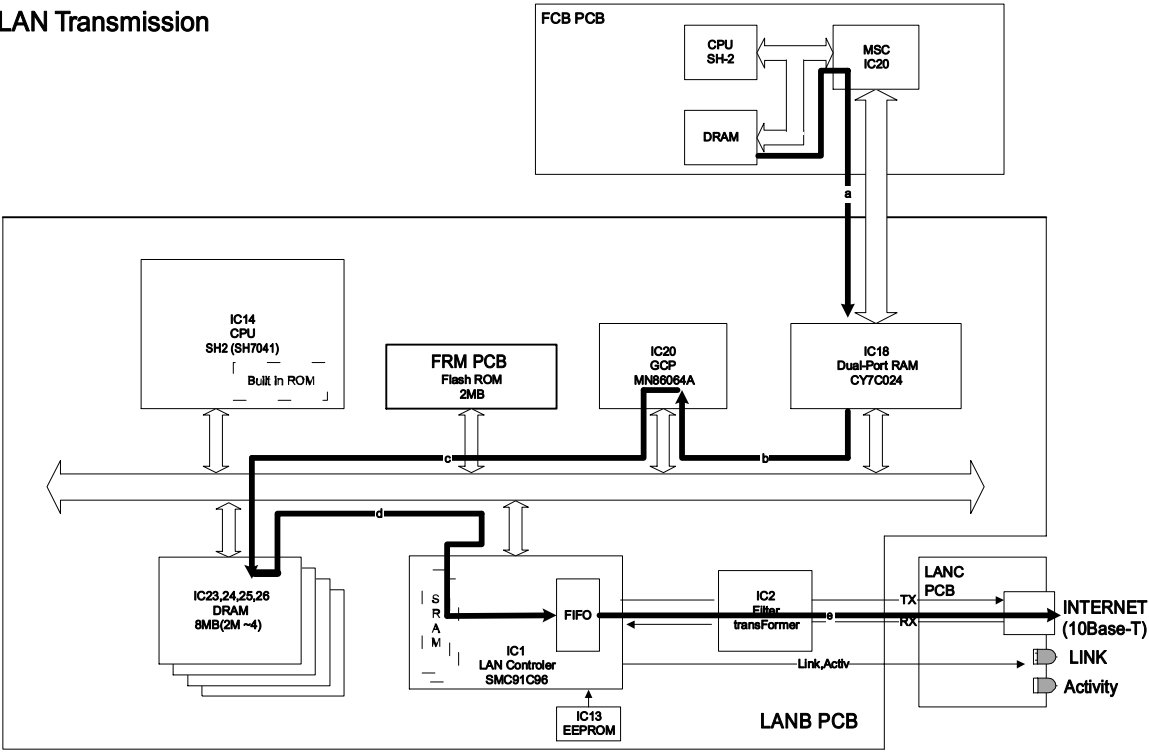
Direct Reception



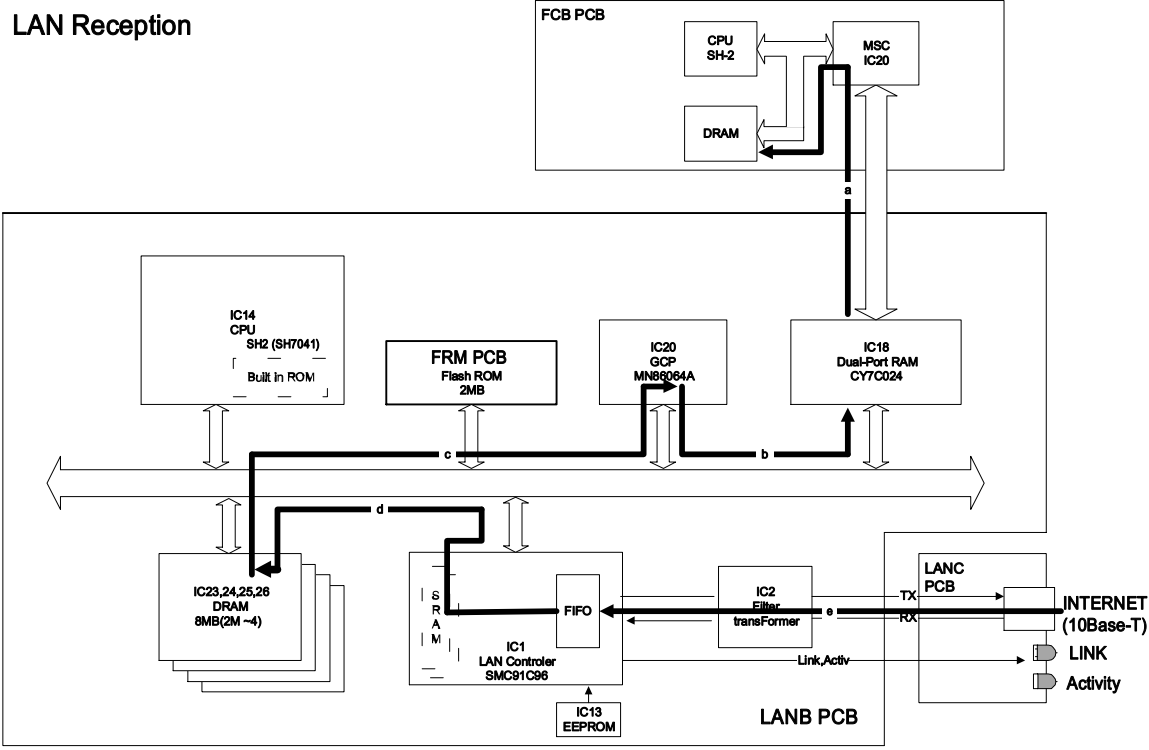
Report/List Printing



LAN Transmission

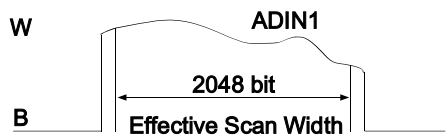
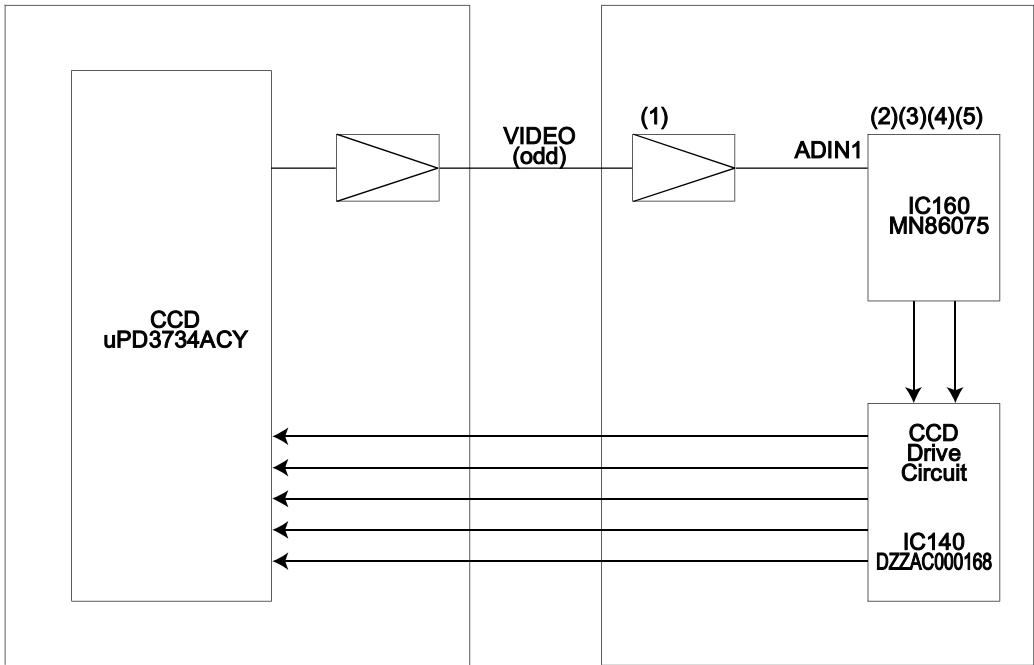


LAN Reception



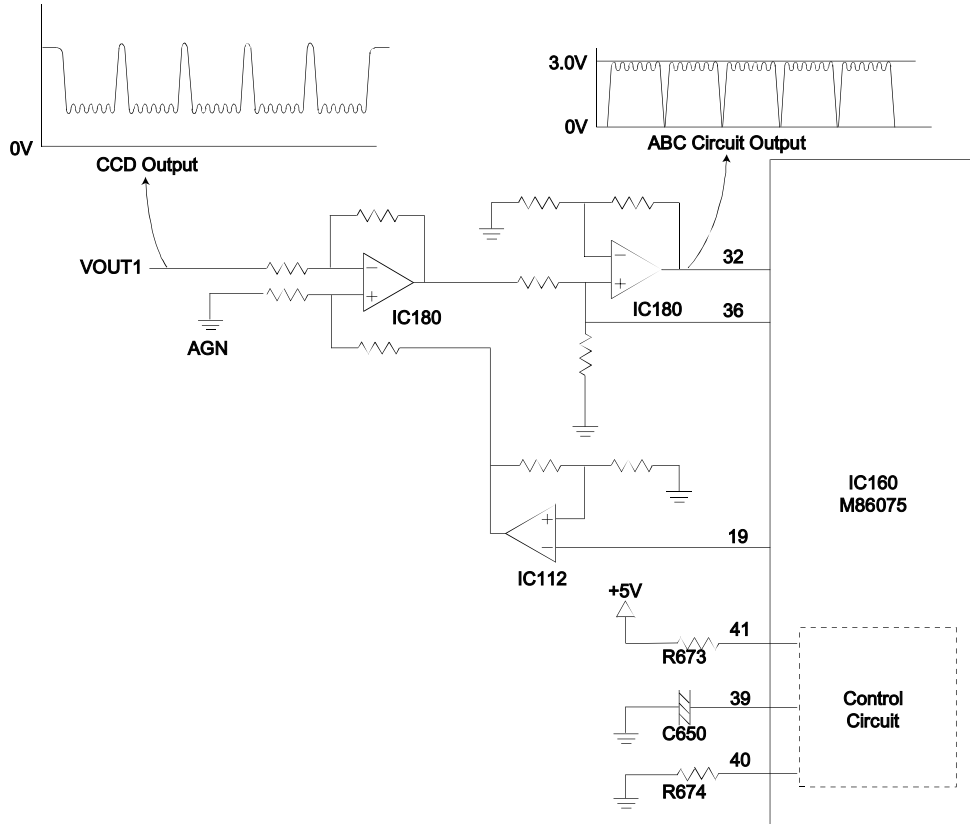
6.2.4. Picture Signal Scanning Block

The image data read by the optical unit is input to the CCD mounted on the CCD PC Board, then transferred to the FCB PC Board after the optical information is converted into an electrical signal by the CCD. The following shows a block diagram of the picture signal scanning circuit. This picture signal scanning circuit consists of (1) ABC circuit, (2) shading correction circuit, (3) offset control circuit, (4) picture signal binary coding correction circuit and (5) reducing circuit.



ABC Circuit

This circuit consists of IC180, IC160, C650, R673 and R674. Its function is to prevent deterioration of picture quality due to dirt on the document or degrading of the luminous energy of the LED light source. The picture signal from the CCD is amplified in IC180 and input to IC160, where it is converted from analog to digital and the shading is corrected. When the signal exceeds +3.0V as the result of this amplification and correction, capacitor C650 is charged through R673. This charging voltage lowers the level of the picture signal input to IC180. When the picture signal voltage rises, this charge voltage becomes higher. When the picture signal level lowers due to the background color, etc., of a transmitting document, the voltage of the charged capacitor C650 is discharged through R674. Consequently, the output of the ABC circuit is kept constant to maintain the picture quality, regardless of changes in the CCD output level.



Shading Correction Circuit

The Shading Correction Circuit, included in IC160, is provided to correct for reduction in LED lamp intensity around the optical lens and LED lamp intensity distortion due to shading of each bit. This circuit scans the reference white on the transmitting document plate immediately before the document reaches the scanning position and writes a compensation value according to the distortion of the waveform, at the time, into the S-RAM (IC170, IC171, IC172). When the actual picture signal is input, the circuit corrects the picture signal shading, according to this compensation value. This shading is carried out for each page during transmission or copy.

Offset Control Circuit

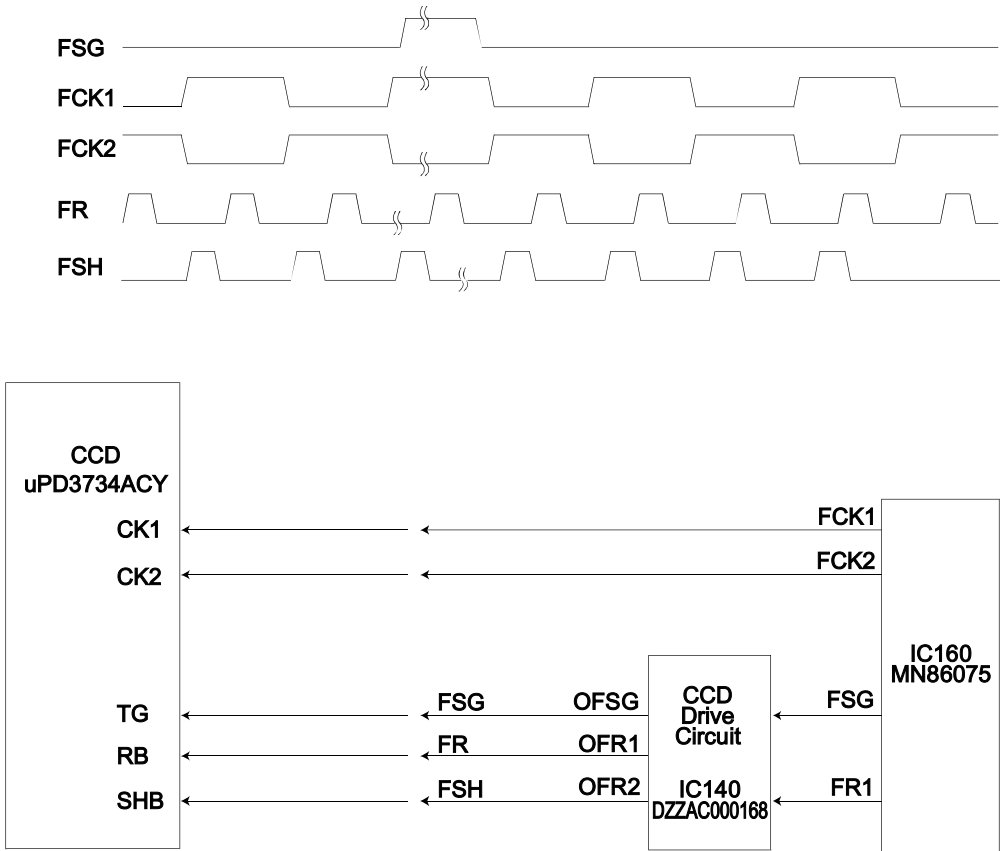
The Offset Control Circuit consists of IC161, IC160 and IC118, and controls the black level of the CCD output to be at 0V by using the IC118.

Picture Signal Binary Coding Correction Circuit

The Picture Signal Binary Coding Correction Circuit is included in IC160. It is used to obtain a binary coding signal which is a corrected picture and error diffused signal of a false halftone signal, which is detected from a shaded picture signal.

6.2.5. CCD Drive Clock Generator Circuit

This circuit is also contained in IC9. Its function is to generate FSG, FCK1 and FR clock signals, which are required for driving the CCD. These clock signals are generated by the system clock generator circuit derived from the 25.0 MHz clock signal that is input to IC160. Its timing chart is shown below. The FSG, FCK1, FCK2, FR and FSH clock supplied to the CCD is output from the OFSG, OFCK1, OFCK2, FR and FSH of IC40 (DZZAC000108). These clocks of IC40 are derived from the FSG, FCK1, and FR clock of IC160 (MN86075) generates the timing of the FSG, FCK1, FCK2, FR and FSH clock to drive the CCD.



6.2.6. Picture Quality Control Circuit

This circuit consists of a recording picture control standard cell IC140 (DZZAC000168 or "1PC"), an interpolation table ROM (IC141) and its peripheral circuitry. The recording picture control standard cell (IC140) inputs the serial data from the IC110 (DZZAC000167 or "PEC"), conducts picture quality correction (smoothing), reduction, synchronization control, etc., then sends this data to the printer. These functions are as follows:

Picture quality correction circuit (smoothing)

Compares the picture element with 15 surrounding picture elements, determines the interpolation data from the interpolation data ROM, and smooths out diagonal lines, etc., on the recorded picture.

Image range isolation circuit

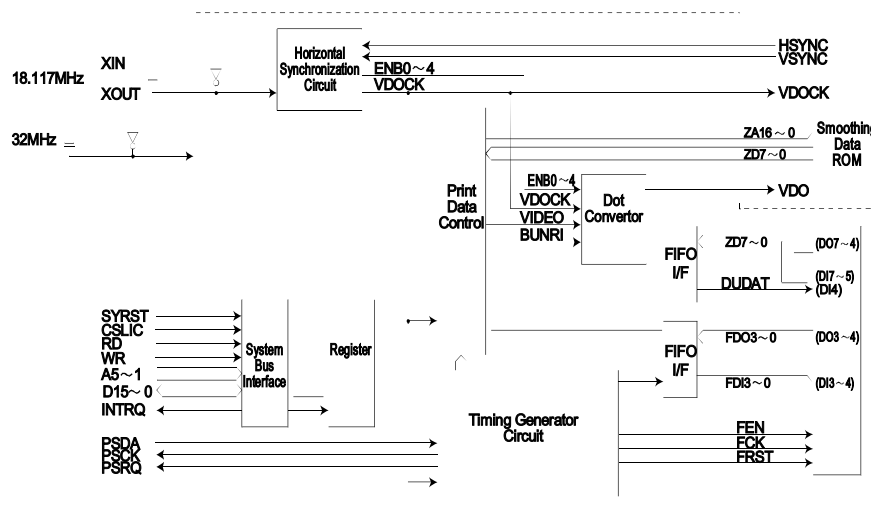
Identifies the halftone picture range and controls smoothing to eliminate blotching of the recording picture which has undergone error diffusion or other processing.

Reduction circuit

This circuit is used to process the received data so that it fits on the recording paper, according to the Fax Parameter settings.

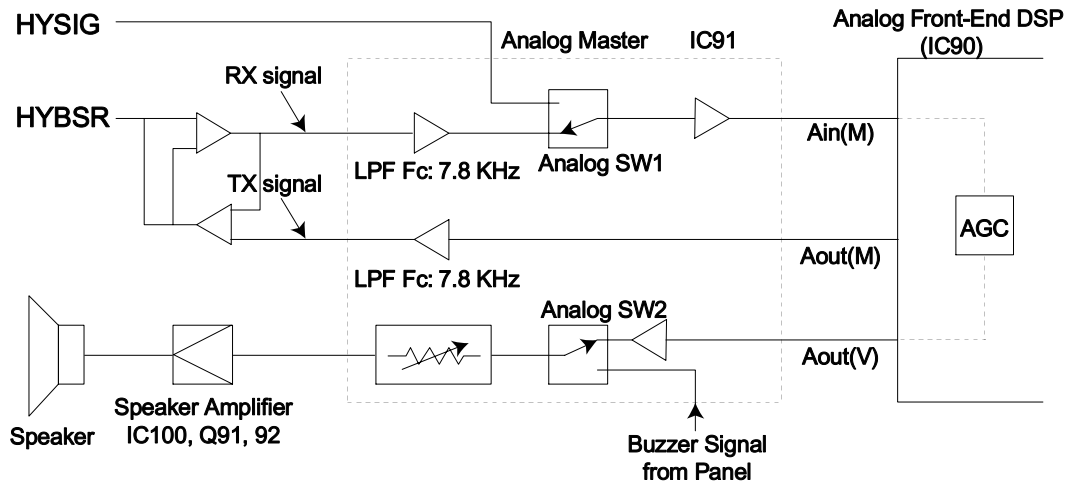
Synchronization control circuit

This circuit is used to synchronize the output recorded data with the horizontal synchronizing output signal from the printer for each line. Within a line, it is synchronized with the dot clock signal. The dot clock signal is provided by dividing the crystal oscillator frequency from the Extend Generator Circuit (32 MHz : 16 x 15.4, 18.117MHz : 600dpi) by 5.



6.2.7. Line Monitor Circuit

The Line Monitor Circuit consists of an operational amplifier (IC100), analog master (IC91) and its peripheral circuits. Its function is to monitor the dial tone, DTMF tone, response signals, etc. over the speaker. It also sounds the output of the key touch tones, alarm tones, etc. from the panel CPU over the speaker. The received signal from the Ain (M) passes through an AGC circuit and is conditioned by the Analog Front-End DSP (IC90) and is then input to the Analog SW2 for volume control. The signal is then input to the Speaker Amplifier (IC100, Q91, 92), where it is amplified to a level sufficient to drive the speaker. The key touch tones and Buzzer Signals from the panel are input to the Analog SW2 for volume control and then input to the Speaker Amplifier. The monitor tone from the phone line and the buzzer tone from the panel can be adjusted from the Control Panel.

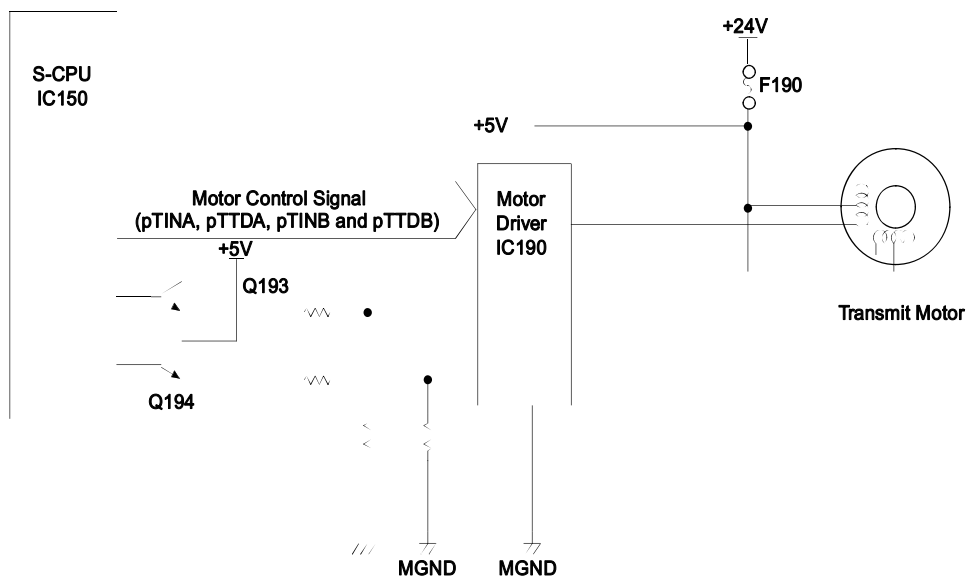


6.2.8. Transmit Motor Control Circuit

The transmit motor is a stepper motor powered by +24 VDC and driven by a 1/2-phase excitation, greater step division is provided by controlling the phase circuit in steps.

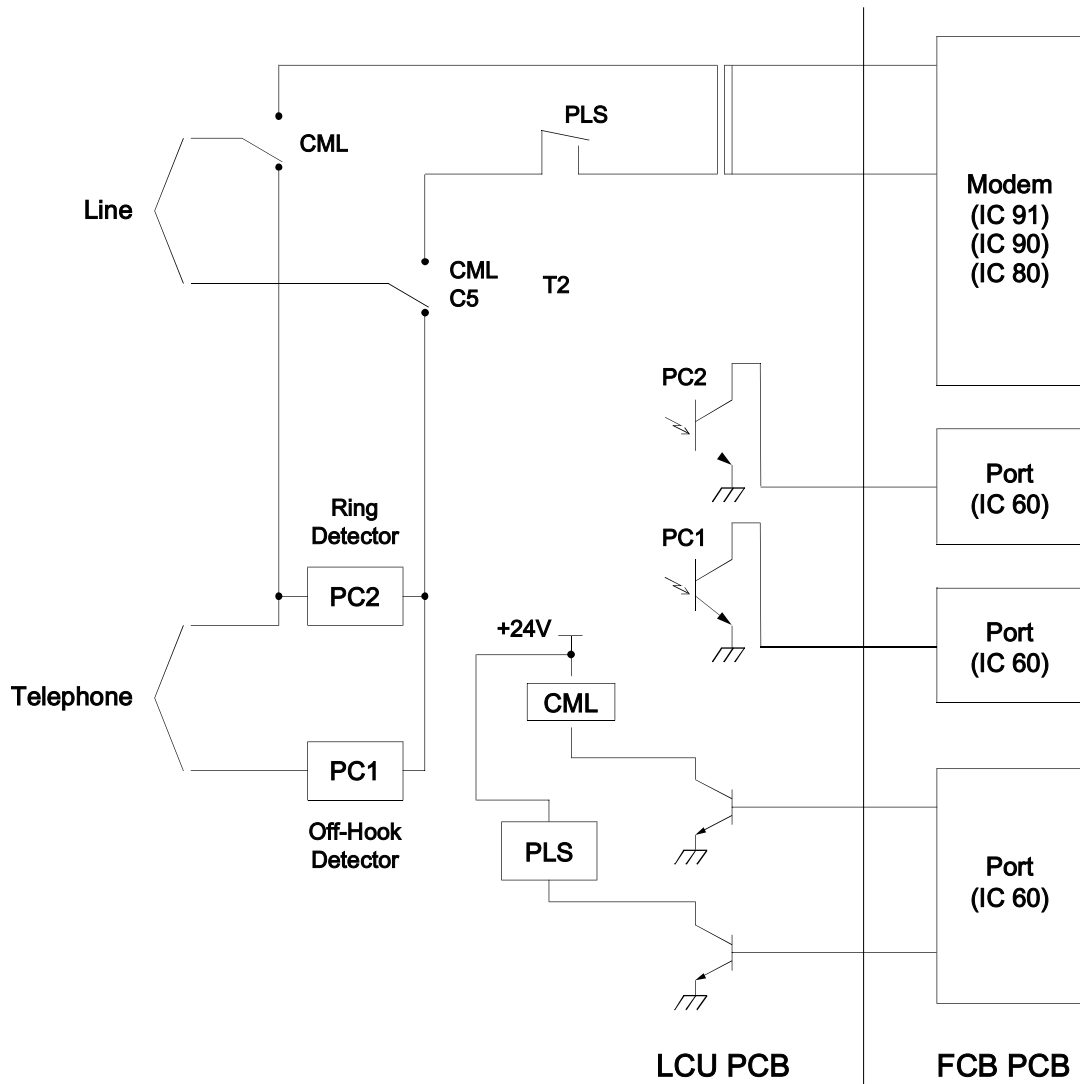
The stepping signal and chopping current control signals (pTINA, pTTDA, pTINB and pTTDB) are sent to the chopper drive circuit, comprised of IC190 and its peripheral circuitry, from the IC150 (S-CPU) output port.

Tx Motor Driver Circuit Block Diagram



6.2.9. Line Control Board

The following shows a block diagram of the Line Control Board.

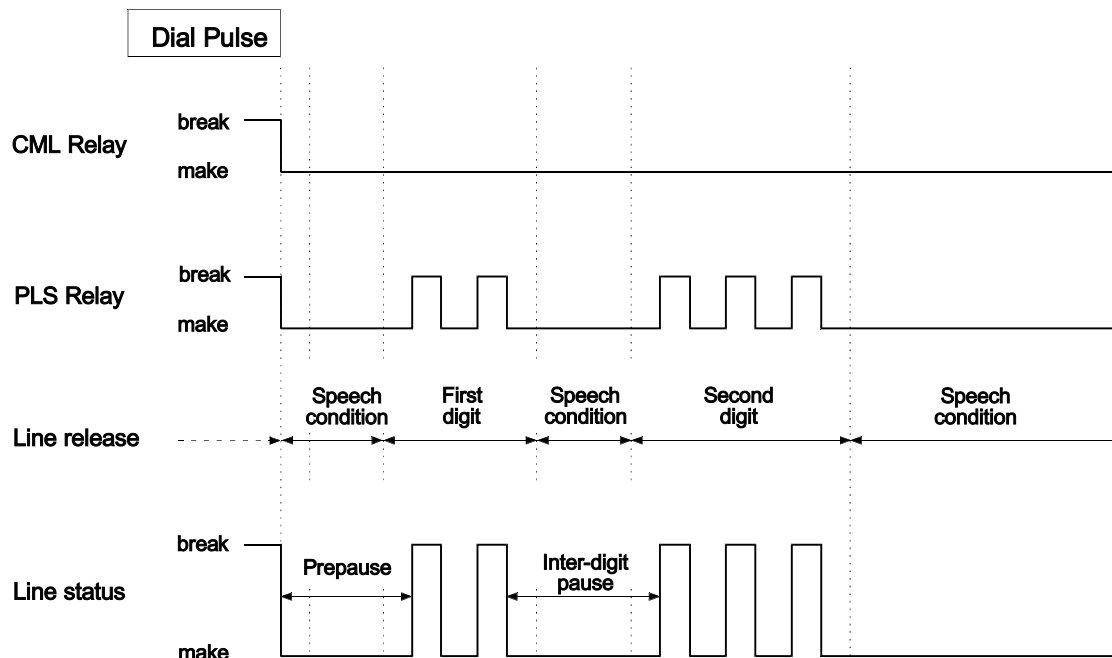


The **Ring Detector** consists of a photocoupler, PC2, and its peripheral circuits. The ringing signal is half-wave rectifier in the Ring Detector, and transferred through the nCTON signal line to the IC60 on the FCB PC Board. The IC60 observes the signal to distinguish from signals caused by chattering.

The **Off-Hook Detector (External Telephone)** circuit consists of the photocoupler, PC1, and its peripheral circuits. When PC1 detects loop current flow, it emits a Low active output signal (nHKOF) to the IC60 which monitors it for a specified time. If the IC60 detects no change in the Low signal level, it determines that the External Telephone is Off-Hook.

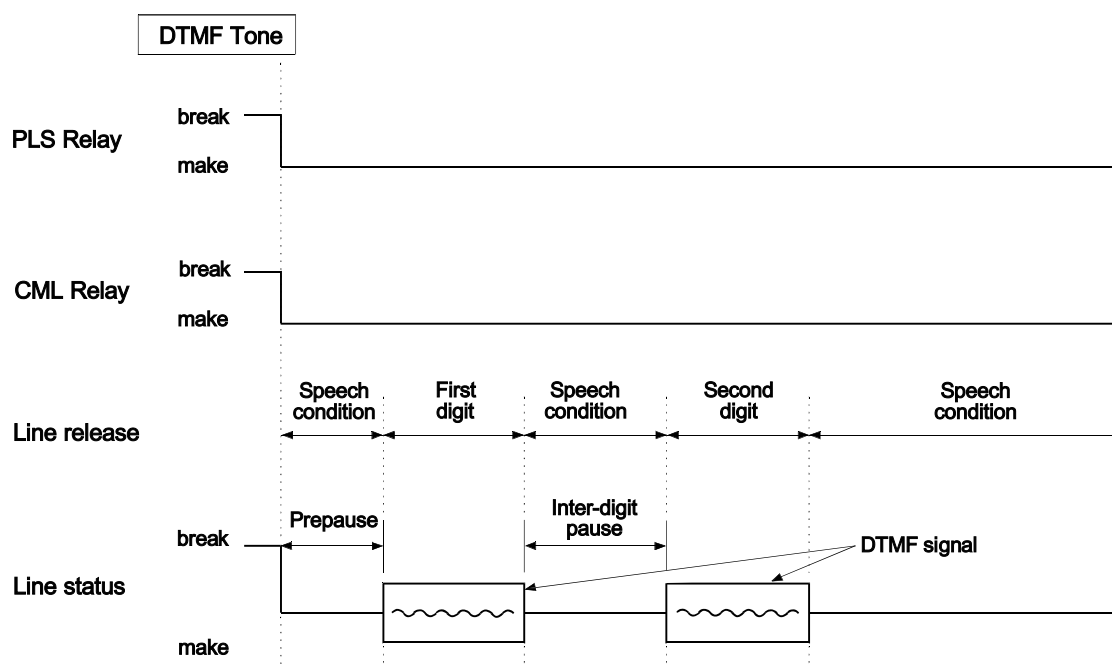
Dial Pulse Generator

The circuit consists of the CML relay, PLS relay and their peripheral circuits. This circuit generates dial pulses. The CPU on the FCB PC Board controls all dial pulse generation sequences. It turns relay CML and PLS ON and OFF through the DZZSP58025 (IC60). The status of the relays during dialing is shown below. When the absence of the terminating message is confirmed by the Off-Hook detector, the CPU turns CML relay ON to develop loop status (DC loop). After a few seconds, the CPU turns the PLS relay On and Off to generate dial pulses, making and breaking the loop.



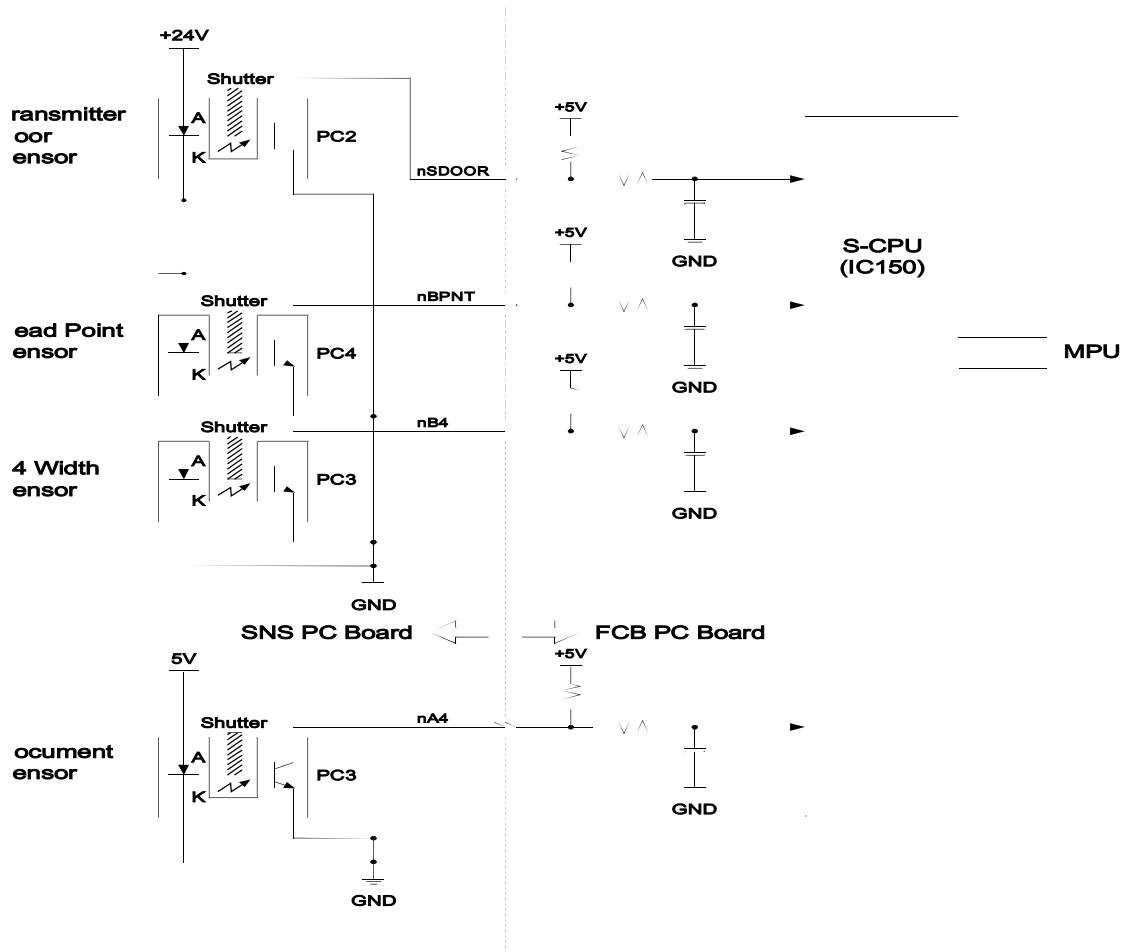
DTMF Tone Generator

The circuit is incorporated in the MODEM on the FCB PC Board. The DTMF tone is conveyed to the telephone line using the same route as the facsimile signal. The DTMF tone selection is controlled by the CPU. The relay status during dialing is shown below.



6.2.10. SNS PC Board

Each sensor consists of an LED and phototransistor. When documents are placed on the ADF tray or are moving, a shutter in the document sensor closes. The light path from the LED is blocked turning the phototransistor "OFF", and the output voltage from the sensor becomes a "High" level. With no document on the ADF tray, the shutter opens the light path, and output from the sensor is kept at a "Low" level. Operation of the RP Sensor is opposite to the ADF Sensor. When the leading edge of the document reaches the RP Sensor, the shutter opens and the output voltage becomes a "Low" level. Then, the shutter closes and the output becomes a "High" level when the lagging edge of the document clears the RP Sensor. The Tx Door Sensor operation is the same as the ADF Sensor, the output from the sensor is kept at a "Low" level when the door is closed and becomes a "High" level when the Tx Door is opened.



6.2.11. Control Panel

The Control Panel consists of the Display PCB and Panel Unit, which display various status information. It is normally interfaced to the main CPU. Keyed input signals are received by the Panel CPU and the data is transferred to the main CPU on the FCB PC Board.

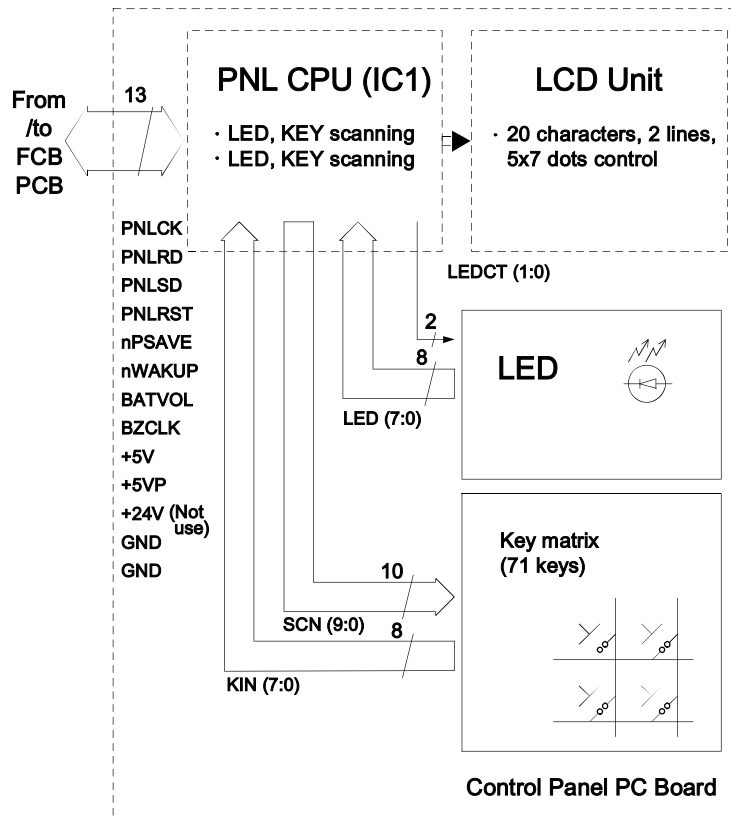
The Control Panel performs the following processes simultaneously:

- Key inputting
- LED, LCD display
- Data transmission / reception

Interface to main CPU

The interfacing between the main CPU and the panel CPU are all executed with commands and responses in the following two formats:

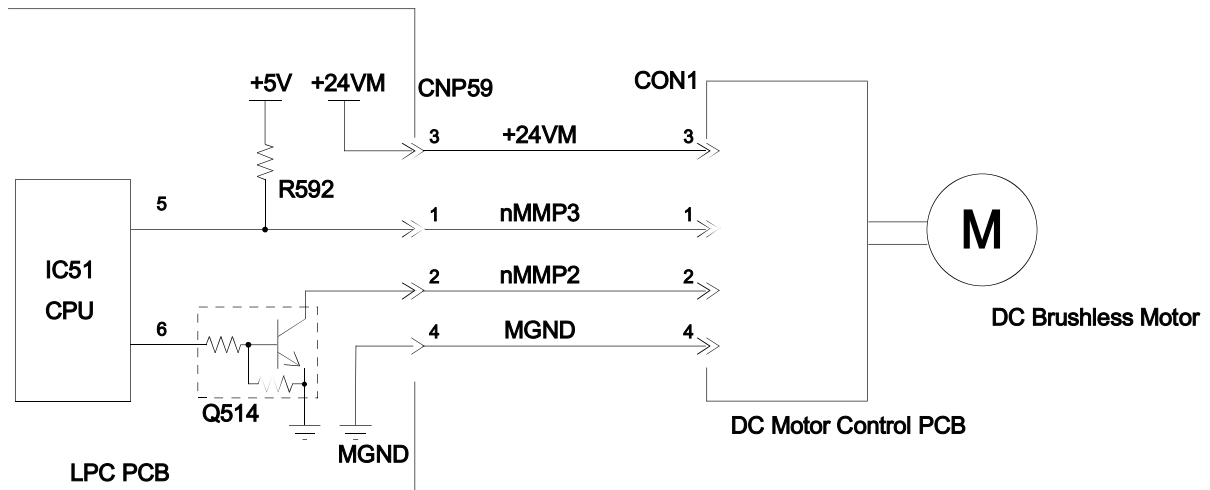
- Command / response (1 byte) + number of data + check sum
- Command / response (1 byte) + number of data + data 1 + data 2 + data n + check sum.



6.2.12. Printer Motor Drive Circuit

Motor Drive Circuit

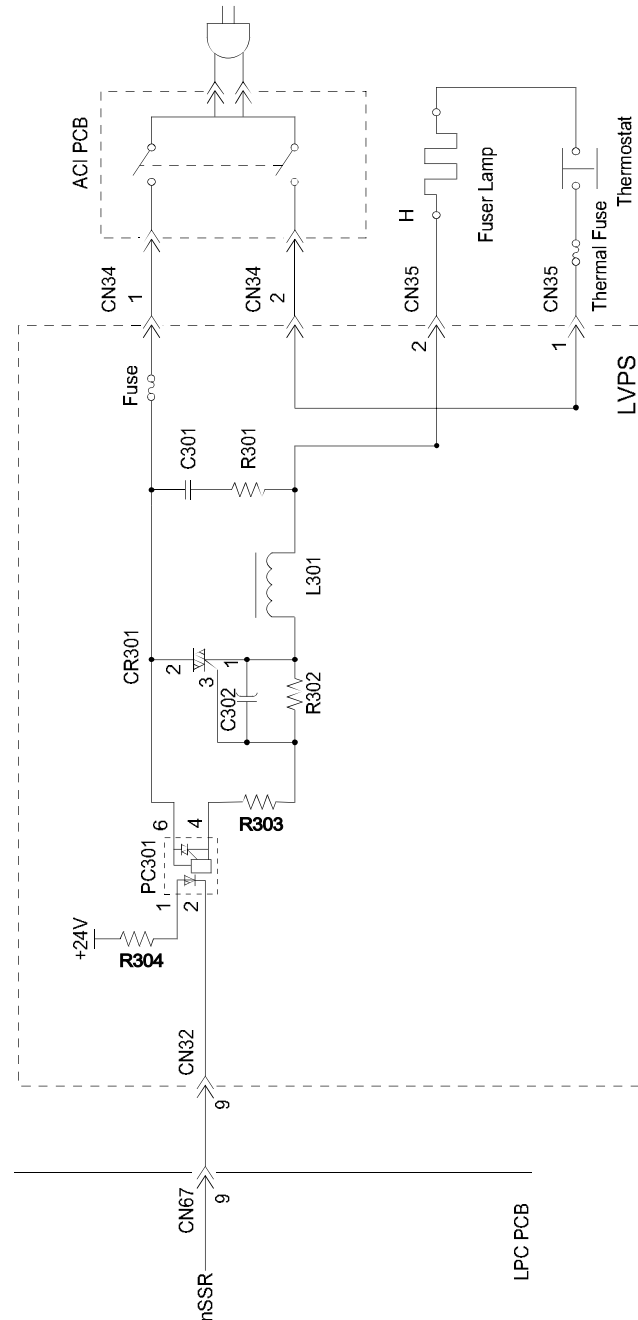
The Printer Motor is a Brushless DC Motor. When the nMMP2 signal level goes Low, the Printer Motor starts rotating. When the Printer Motor reaches a constant speed, the monitor feed back signal, nMMP3 goes Low and is fed back to the CPU which controls the printing process. The Printer Motor is powered by a +24 VDC supply. When the interlocks are open, the +24 VDC supply is cut off and the Printer Motor stops rotating.



Laser Printer Motor Drive Circuit Block Diagram

Fuser Lamp Drive Circuit

The Fuser Lamp is powered by 115 VAC. It is driven by the LVPS and controlled the FCB PC Board. When the CN32, Pin 9 (nSSR) on the LVPS goes LOW, the Fuser Lamp turns ON. This lights up the PC301 LED and activates the CR301 photo-triac, and 115 VAC is sent to the Fuser Lamp. The time at which CR301 is actually activated depends on the 115 VAC sine wave. When the cross-voltage for Pin 6 and Pin 4 of PC301 is other than 0 Volts (sine wave exceeds 0 volts), PC301 inhibits the activation of the triac and turns ON the Fuser Lamp.

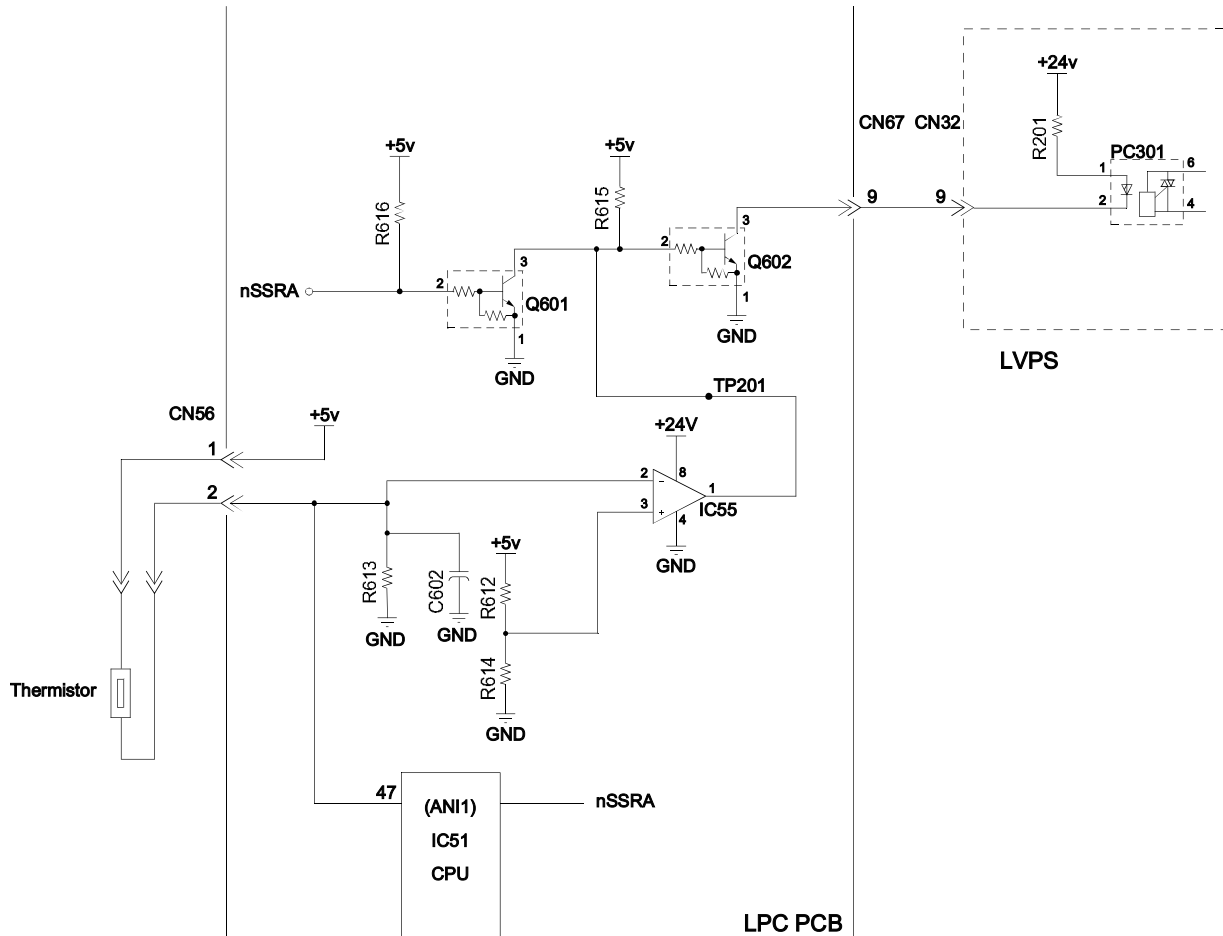


Fuser Lamp Drive Circuit Diagram

Fuser Temperature Control Circuit

The fuser temperature is controlled by IC51 on the LPC PC Board, which contains A/D (Analog/Digital) converters ANI0 and ANI7. The Fuser Temperature Control Circuit uses A/D converter, ANI1. When the PC301 drive current is transmitted from the LPC PC Board to the LVPS, the Fuser Lamp turns ON. IC55 is a converter with open output at pins 1 and 7 and is used as an abnormal temperature detection circuit. IC55, pin 1, has a high impedance when Q602 is activated, turning ON the Fuser Lamp. An abnormal temperature is detected when the VTH voltage level becomes higher than V+, forcing IC55, pin 1 Low and deactivating Q602.

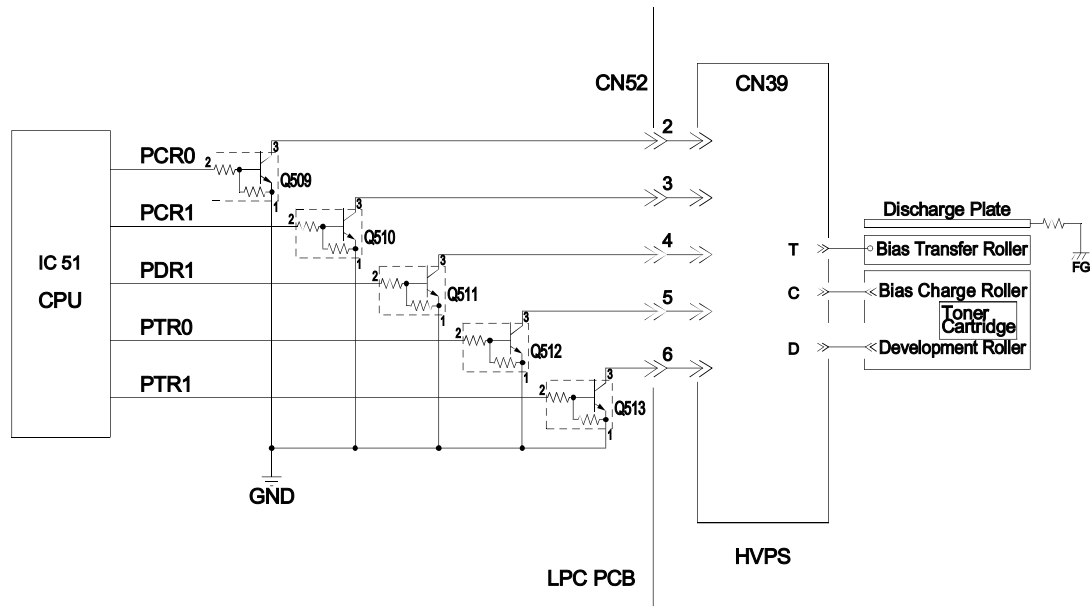
Abnormally low and high temperatures, as well as Thermistor release status, are detected by IC51 (CPU) programming.



Fuser Temperature Control Circuit Diagram

High Voltage Drive Circuit (Charging, Development and Transfer)

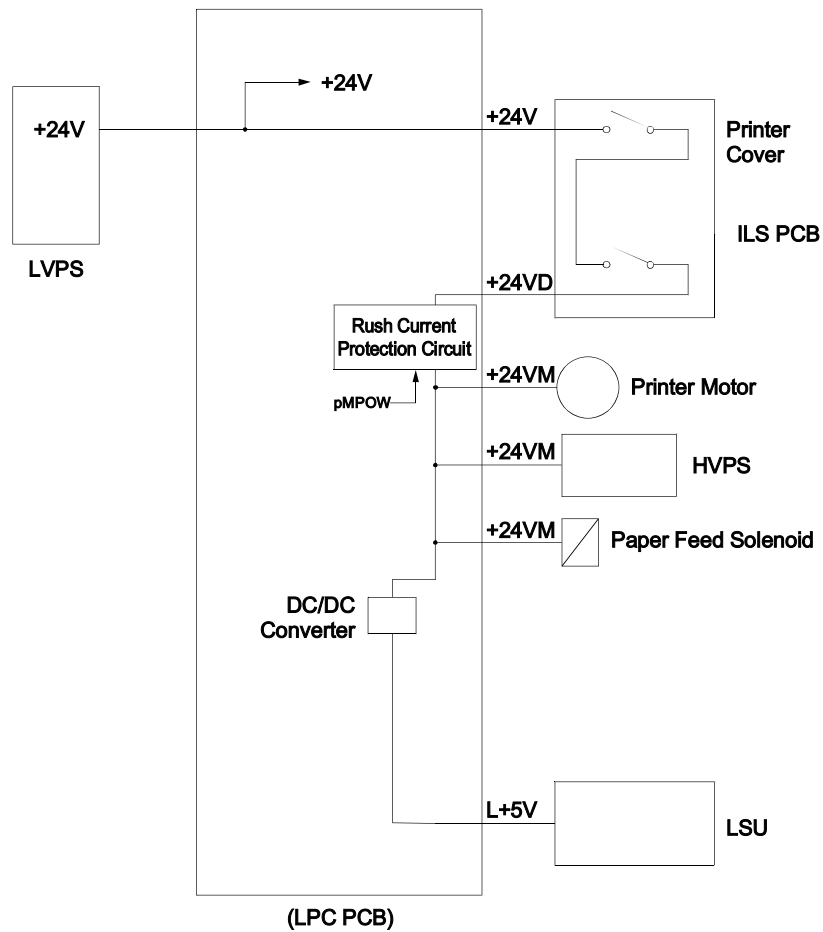
High Voltage is provided through a DC to DC converter, which changes the +24 VDC supply voltage to -650 VDC, and output approximately 0.72 KVAC (Steady current: 450 μ A) for the Charging Block. The Developer Circuit converts the +24 VDC to between -500 VDC for the development bias, and outputs 1,700 VAC(p-p) at a frequency of 1.7 kHz to charge the toner. The Transfer Circuit changes the +24 VDC supply voltage to approximately +600 VDC (steady current: 3.0 μ A/-800 VDC steady voltage).



High Voltage Drive Circuit

6.2.13. Interlock Safety Circuit

This safety circuit turns OFF the +24 VDC supply voltages when the Printer Cover is opened. When the Printer Cover is opened, the microswitch(es) on the ILS PC Board are de-actuated, turning OFF +24 VDC to the Printer Drive Circuit, the HVPS, and the Paper Feed Solenoid Circuits, turning OFF the +5 VDC supply voltage for the Laser Driver Circuit on the Laser Unit.



Interlock Safety Circuit Block Diagram

6.2.14. LSU Control Circuit

The laser control signals are described below.

nLDON

The LSU is activated when this output signal is LOW. If an error occurs, the nLDON output signal level goes High and the LSU is deactivated.

nVIDEO

This is the actual Data Signal. The Laser is ON when the nVIDEO output signal level is LOW.

nHSYNC

This horizontal synchronization signal transmitted from the Beam Detection Sensor sets the horizontal position of the laser beam as it crosses the OPC Drum.

nPMON

This is the Polygon Motor Control Signal. The Polygon Motor rotates when the nPMON output signal level is LOW.

nPMRDY

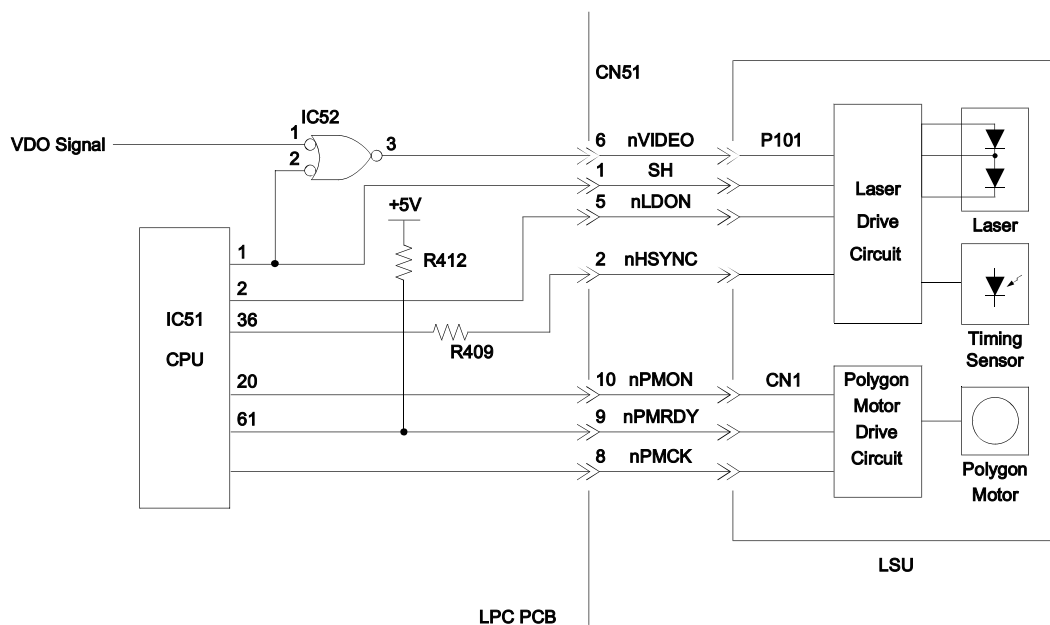
A Phased-Lock Loop (PLL) circuit keeps the Polygon Motor speed constant at 10,000 rpm when the nPMRDY is at a Low output signal level.

nPMCK

This is the Polygon Motor Rotate Clock.

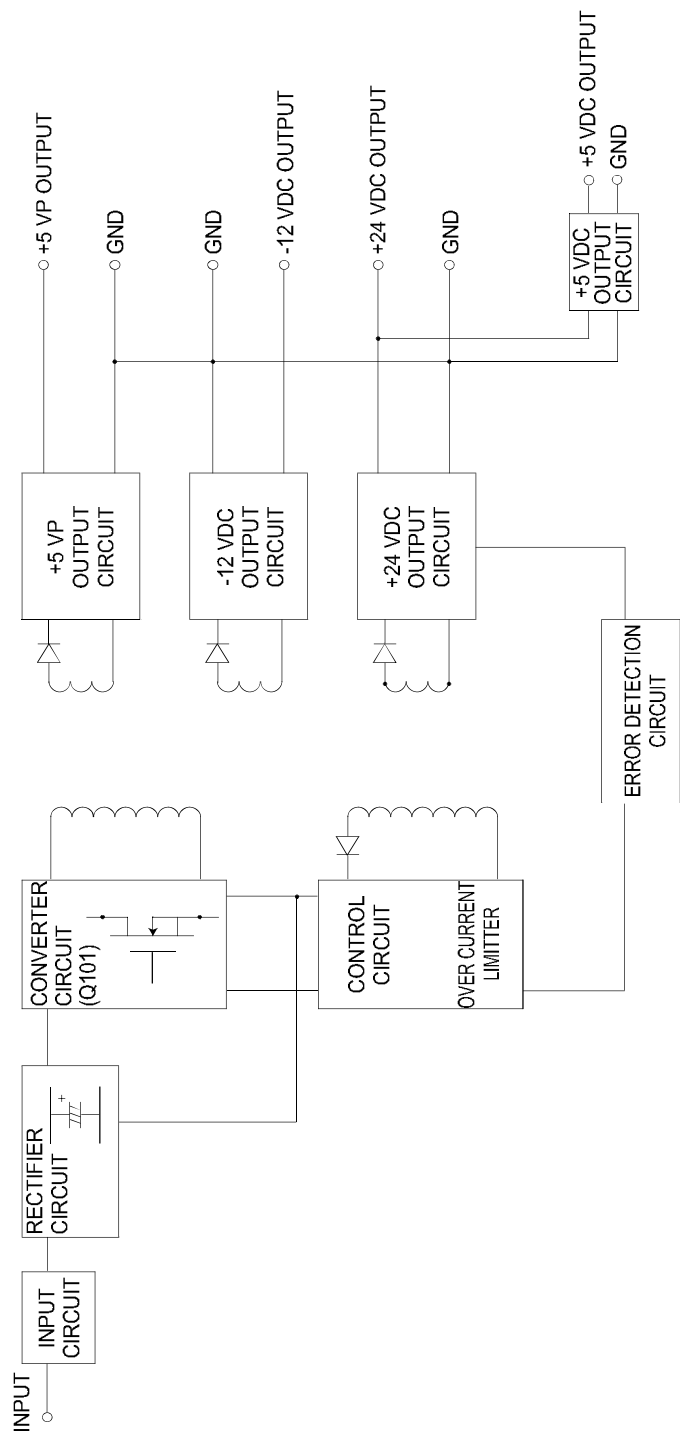
SH

Laser Power Sample/Hold Timing Signal.



Laser Unit Control Circuit Block Diagram

6.2.15. Power Supply Unit (LVPS)
Block Diagram of ETXDN218A7D, ETXDN218E7D



ETXDN218A7D (115V), ETXDN218E7D (220V)

Input Filter Circuit

AC line voltage travels to the rectifying circuit through the line filter. The line filter eliminates RFI noise which may otherwise pass to the AC line from the power supply unit. It also protects the power supply unit from transient noise which may pass into the unit from the AC line.

Rectifying and Smoothing Circuit

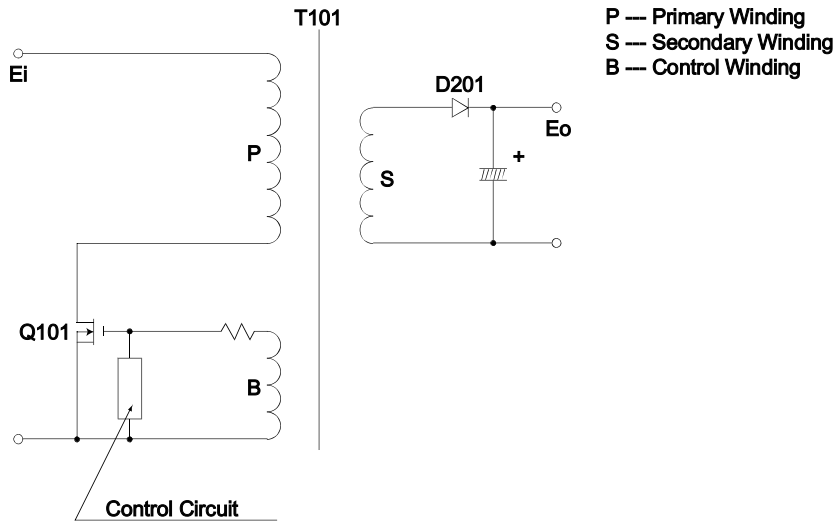
As soon as power is applied to the Power Supply Unit, AC line voltage is rectified by C105 and is smoothed by capacitor C107. The protection circuit at the time of start-up is controlled by an IC (IC101) and resistors R103 and R110.

Inrush Current Protection Circuit

When the capacitor C105 is not charged by the AC input, an inrush current, or current surge, appears at the input side. Power thermistor TH101 limits the inrush current.

Converter Circuit

A hybrid IC (IC101), in combination with transformer T1, form a switching power supply circuit using the RCC (Ringing Choke Converter) system.



Main Switching Circuit

In the above circuit, when the main switching transistor, Q101, is turned On, input voltage, E_i , is supplied to the primary winding of transformer T101. However, no current will flow through diode D201 of the secondary side, due to reverse polarity of the secondary winding causing no current flow within T1. But the transformer charges with energy. When Q101 is turned Off, the supply voltage to the primary winding shuts off and the windings of T101 change polarity, allowing D201 to conduct, releasing the energy accumulated in T101 to the circuit. When the energy is discharged through D201, Q101 turns on, once again reversing the polarity on T101 windings, creating a self-oscillation circuit.

he value of output voltage is

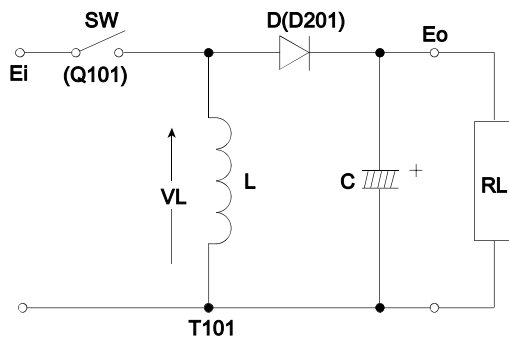
$$o = d/(1-d) * E_i$$

T_{on} : On time of Q101

$$= T_{on}/T_s$$

T_s : Period of oscillation

quivalent circuit model for the RCC.



In the equivalent circuit ; When SW is on, current flows

$$SW \rightarrow L$$

When SW is off, current flows

$$L \rightarrow D \rightarrow RL$$

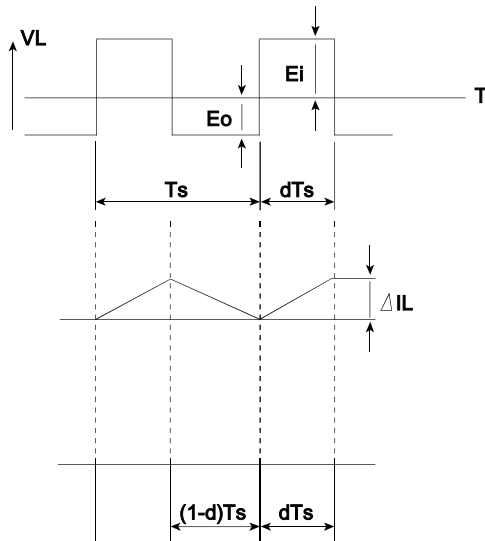
The value of inductance increase current between on period. ($d * T_s$)

$$I_L = E_i / L * d * T_s \dots \dots \dots (1)$$

The value of inductance decrease current between off period. ($(1-d) * T_s$) \dots \dots \dots (2)

From equation (1) and (2),

$$E_o = d/(1-d) * E_i$$



In the actual circuit, the fixed output voltages are obtained by changing the winding ratio of transformer T101. In this converter circuit, the output voltages are stabilized by controlling the duty cycle of the ON and OFF timing of the transistor. In this power supply, the bias winding is built into the transformer. The power supply has four outputs, +24 VDC, -12 VDC, +5 VP and +5 VDC. The +24 VDC output is protected by the Error Detection Circuit, and the +5 VP and -12 VDC outputs are protected by the circuitry inside of the voltage regulator IC, +5 VDC is protected by ZD251.

Control Circuit and Error Detection Circuit

The control circuit amplifies the output of the duty cycle according to the error voltage detected by the Error Detection Circuit, and drives the main transistor Q101. The method used to change the duty cycle is to change the ON time period. When the output voltage of the +24 VDC circuit rises, the current of photocoupler PC101 increases, the output pulse width of the control circuit decreases and the ON time period of Q101 decreases. This control circuit decides the minimum OFF time period by itself. When the oscillation frequency becomes higher and the OFF time period becomes minimum, the OFF time period remains unchanged and only the ON time period decreases. This way, there is a upper limit of the oscillation frequency and the duty cycle is expanded.

Over Current Limiter

The +24 VDC output is limited by Ton MAX Limiter (ON time period of transistor Q101) which is part of the control circuit. The +5 VP, -12 VDC and +5 VDC outputs have over current limiters provided inside the voltage regulator and IC251.

6.2.16. LAN Control Circuit

6.2.16.1. CPU and Peripherals

The SH-2 used on the LAN Control Circuit is the same type as on the Fax Controller Circuit CPU. The LSI is powered by +5 VDC supply voltage instead of the +3 VDC supply voltage used for the Fax Controller. The internal clock is two times faster than the clock on the CPU of the Fax Controller Circuit.

The 7.1 MHz input clock signal is provided by dividing the crystal oscillator frequency (28.4 MHz) by 4.

All the devices mounted on the LANB PCB operate on +5 VDC supply voltage.

These functions are shown in the block diagram on the previous page and also described as follows:

1. CPU

a. Bus Interface

An interface that provides isolation of address map, controls signal output required by various memory and I/O devices. Flash ROM and LAN controller are directly connected to CPU bus.

b. Interrupt Control

Controls each device (GCP, Dual-Port RAM, LAN controller) I/O interrupt and data transfer.

c. DRAM Controller

Controls external Memory (DRAM).

d. DMA Controller

Controls interface for GCP (CODEC) and DMA transfer.

e. Built in ROM

This is a mask ROM that contains stored boot data.

2. Peripherals

a. Flash ROM

The FRM PCB is assigned.

The memory size is 2 MB and is used to store the program and font data.

b. DRAM (IC23, 24, 25, 26)

The 8 MB memory size is for processing image data.

c. GCP (IC20)

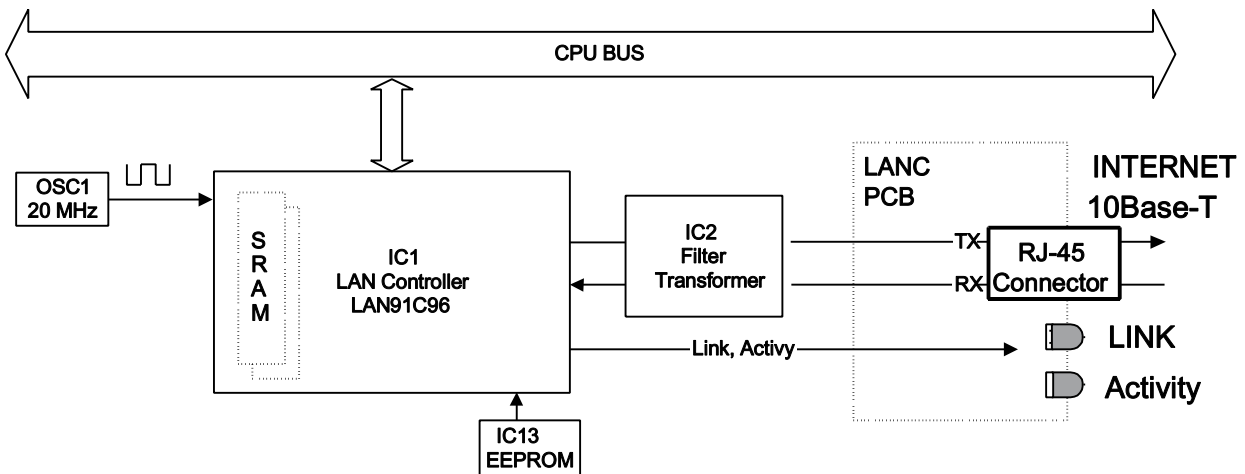
Decoding and encoding of image data is being processed while LAN communication is being executed.

The Encoding Logo data is also being processed while the transmission is being executed.

d. Dual-Port RAM (IC18)

Data transfer between Fax Controller (FCB PCB) and LAN Controller (LANB PCB) is made by interrupt control through Dual-Port RAM.

6.2.16.2. LAN Controller



1. LAN Controller (IC1)

This conforms to IEEE 802.3 Ethernet Controller.

The CPU bus is directly connected and the data interrupt is controlled by IRQ 0. The 20 MHz clock is supplied by OSC 1. The LAN Controller for the system timing clock divides the frequency provided from OSC 1 into 10 MHz clock. The clock signal is also supplied for the Manchester encoding/decoding circuit for data conversion. The LAN controller contains a built in 6 KByte RAM for transmission and reception buffer.

2. EEPROM (IC13)

This memory stores the configuration registers and MAC (Media Access Control) address for the LAN controller. Data is transferred to LAN controller (serial transfer) when the power is turned "On". The MAC address for the LAN controller represents the location on the LAN.

3. Filter Transformer (IC2)

A choke module transformer with a low-pass Butterworth filter.

The output TX signal from the LAN controller is differentiated and transmitted on to the LAN via this module. Similarly, the input RX signal (differential input pair) is terminated by an externally connected 100 ohms resistor and input to the LAN controller via this module.

4. Ethernet Interface

Provides the 10Base-T Ethernet interface.

6.2.16.3. LED

1. LINK LED (LED1)

The LINK LED normally illuminates when the LAN cable is connected and when a link pulse is detected. Consequently, LED can be used to determine whether the 10Base-T cable has become disconnected (RX side).

2. Activity LED (LED2)

This LED illuminates when reception data is present on the LAN. (The LED also illuminates when reception data for other devices is present.)

6.2.16.4. Signal Routing

1. LAN Transmission

- a. Transfers the MMR coded image data from FCB PCB every specified size.
- b. Transfers the MMR coded data from Dual-Port RAM to GCP and converts the MH coded data.
- c. Transfer the MH coded data of GCP to DRAM.
- d. Transfer the converted text data to buffer RAM on LAN controller sequentially.
- e. The transmission packet is processed by FIFO transfer to buffer RAM and then converted for Manchester code. Finally, they are converted for differential pair signal and transmitted to Internet.

2. LAN Reception

- a. Processed received data for Manchester coded signal at LAN controller.
- b. The decoded received packet goes to buffer RAM through the FIFO. The data stored in buffer RAM is transferred to DRAM sequentially.
- c. Decodes the Base 64 for MH coded image data at DRAM and transfers GCP.
- d. Converts the transferred MH data at GCP and transfers Dual-Port RAM.
- e. Inputs MMR coded data from Dual-Port RAM to DRAM by requests from FAX PCB.


7 Exploded View & Parts List

7.1. Country Codes

Country Code	Country
AU	USA, Puerto Rico
AC	Canada
AB	UK
AG	Germany
AL	Australia

Note:

1. This parts list is provisional issue for each countries. Please contact local Panasonic company to get correct part number.
2. Important safety notice

Components identified by  mark have special characteristics important for safety.
When replacing any of these components, use only manufacturer's specified parts.

7.2. Cover Assembly

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
101	-	DZJE000165	Cradle, Upper	1	1	-	-	-	1A
102	-	DZFN000090	Cord, Cradle	1	1	-	-	-	1B
103	-	DZEC100422	SRU PCB Assembly	1	1	-	-	-	2B
104	-	DZJE000166	Cradle, Lower	1	1	-	-	-	2A
105	-	DZMA002174	Cover, Front	1	1	1	1	1	7K
106	-	DZMA001406	Cover, Sub Front	1	1	1	1	1	6I
107	-	DZMA001393	Cover, Left Side	1	1	1	1	1	8D
108	-	DZMA001396	Cover, Rear	1	1	1	1	1	6C
110	-	DZMA000386	Cover, Paper Guide	1	1	1	1	1	3H
111	-	DZML000100	Guide, Paper, Right	1	1	1	1	1	1G
112	-	DZML000101	Guide, Paper, Left	1	1	1	1	1	1H
113	-	DZLF000077	F-Gear, D14	1	1	1	1	1	3G
114	-	DZMA001403	Cover, Sub Rear	1	1	1	1	1	4A
115	-	DZMC000507	Cover, Memory Card	1	1	1	1	1	4A
116	-	DZMC000554	Cover, Modular Jack	1	1	-	-	-	6A
116	-	DZMC000551	Cover, Modular Jack	-	-	1	-	-	6A
116	-	DZMC000552	Cover, Modular Jack	-	-	-	1	1	6A
117	-	DZJM000281	Guide, Transmit	1	1	1	1	1	1B
118	-	DZEC000036	Actuator, C	1	1	1	1	1	2B
119	-	DZEC000083	Actuator, B	1	1	1	1	1	3C
120	-	DZEC000034	Actuator, A	1	1	1	1	1	3D
121	-	DZEC101107	Assembly, SNS	1	1	1	1	1	3C
122	-	DZMB000004	Cover, Printer	1	1	1	1	1	2I
123	-	DZMA000185	Switch	1	1	1	1	1	3K
124	-	DZJE000087	Cover, Sub, Document Tray	1	1	1	1	1	2J
125	-	DZKG000036	Shaft, Latch	1	1	1	1	1	1J
126	-	DZLM000045	Latch	1	1	1	1	1	1H, 2K
128	-	DZKN000085	Spring, Latch	1	1	1	1	1	1H
129	-	DZKP000078	Spring, PC Pressure	1	1	1	1	1	3I
130	-	DZLA000080	Roller, Pinch	1	1	1	1	1	4I
131	-	DZKR000003	Spring, Pinch Roller	1	1	1	1	1	4I
132	-	DZNK001839	Label, Function (English)	1	1	1	-	-	3C
132	-	DZNK002576	Label, Function (French)	-	1	-	-	-	3C
132	-	DZNK002555	Label, Function (German)	-	-	-	1	-	3C
133	-	DZDR000001	Speaker	1	1	1	1	1	7I
134	-	DZEC000037	Actuator, D	1	1	1	1	1	3B
135	-	DZKQ000020	Spring, Actuator	1	1	1	1	1	3B
136	-	DZJA000571	Bracket 2, Front	1	1	1	1	1	7H
137	-	DZJA000569	Bracket 1, Front	1	1	1	1	1	8H
138	-	DZML000250	Tray, Document Return	1	1	1	1	1	7B
139	-	DZML000196	Sub-Tray, Document Return	1	1	1	1	1	7A
140	-	DZFP000743	Harness, SPKR	1	1	1	1	1	6H
516	-	DZJK000006	Clamp, Harness	1	1	1	1	1	3A
1206	-	DZMC000101	Tray, Recording Paper	1	1	1	1	1	8B
1210	-	DZML000303	Cradle Assembly	1	1	-	-	-	1B
1211	-	DZDU000031	Handset	1	1	-	-	-	1A
1212	-	DZFN000066	Cord, Handset	1	1	-	-	-	1A
1Y	-	XTB3+10J	Screw	1	1	1	1	1	6I
11	-	XYN3+F12	Screw	1	1	1	1	1	1J
19	-	XTB3+8J	Screw	1	1	1	1	1	1C, 2H, 2H, 3B, 3C, 3F, 3H, 7H
23	-	XYN3+F8	Screw	1	1	1	1	1	1H, 3K
B1	-	DZPB000007	Screw	1	1	1	1	1	2H, 3B, 4A, 4B, 4C, 6I, 8C
C8	-	XTW3+8SFC	Screw	1	1	1	1	1	3G, 6H

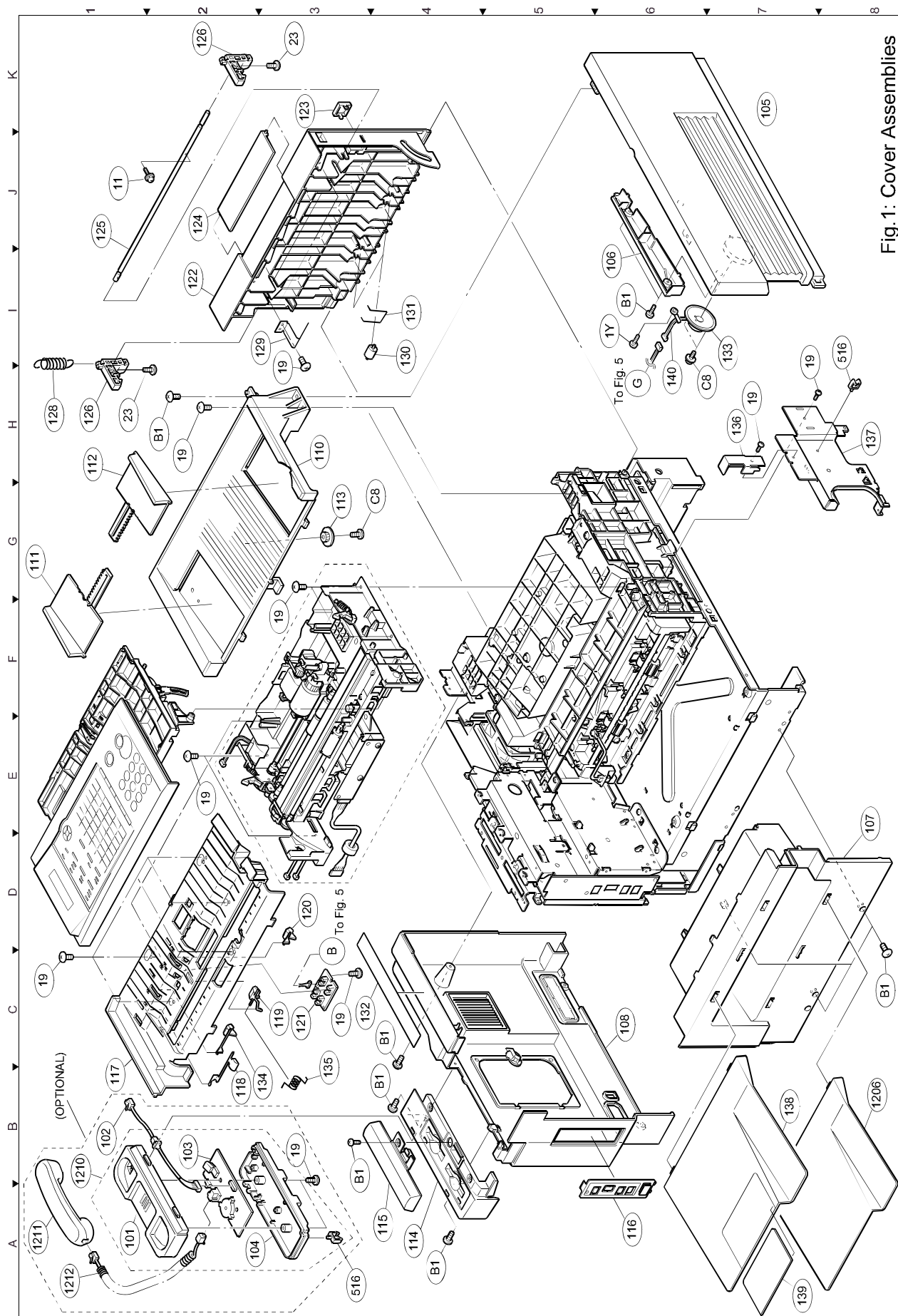


Fig. 1: Cover Assemblies

7.3. Control Panel Unit

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
201	-	DZMA001416	Cover, Panel	1	1	1	1	1	3A
202	-	DZNA000501	Sheet, One-Touch	1	1	1	1	1	2C
203	-	DZNA000655	Cover, Directory Sheet (AU)	1	1	1	-	1	1C
203	-	DZNA000677	Cover, Directory Sheet (AG)	-	-	-	1	-	1C
204	-	DZNA000498	Plate, LCD	1	1	1	1	1	1A
205	-	DZKB000145	Ten Key	1	1	-	-	-	5D
205	-	DZKB000151	Ten Key	-	-	1	-	1	5D
205	-	DZKB000313	Ten Key	-	-	-	1	-	5D
206	-	DZKB000146	Start Key	1	1	1	1	1	5E
207	-	DZKB000147	Copy Key	1	1	1	-	1	5F
207	-	DZKB000177	Copy Key	-	-	-	1	-	5F
208	-	DZKB000148	Stop Key	1	1	1	1	1	2F
209	-	DZKB000149	Button, A	1	1	1	1	1	1F
210	-	DZKB000529	Button, H	1	1	1	1	1	4B
211	-	DZKB000134	Button, C-A	1	1	1	1	1	5B
213	-	DZKB000136	Button, C-C	1	1	1	1	1	4C
214	-	DZEC101152	PC Board, PNL	1	1	1	1	1	7C
215	-	DZDA000028	LCD Unit	1	1	1	1	1	4A
216	-	DZJF000368	Chassis, Control Panel	1	1	1	1	1	6I
217	-	DZLG000002	Shaft, Pinch Roller	1	1	1	1	1	2I, 5G
218	-	DZLA000092	Roller, Pinch	1	1	1	1	1	2I, 3J, 5G
219	-	DZKB000460	Button, C-D	1	1	1	1	1	5B
221	-	DZKP000154	Ground Plate A	1	1	1	1	1	3I
222	-	DZKA000018	Lever, Adjustment	1	1	1	1	1	2K
223	-	DZJM000014	Cover, Pre-Feed	1	1	1	1	1	4K
224	-	DZJM000072	Film, Pre-Feed	1	1	1	1	1	4K
225	-	DZKN000076	Spring, Coil, Pre-Feed Cover	1	1	1	1	1	3K
226	-	DZKR000004	Spring, Pressure Plate	1	1	1	1	1	6J
227	-	DZJM000013	Plate, Pressure	1	1	1	1	1	5K
228	-	DZKK000023	Latch, Stopper	1	1	1	1	1	6J
229	-	DZJN000042	Rubber, Separation	1	1	1	1	1	4K
231	-	DZGT000007	Brush, Antistatic	1	1	1	1	1	6F
232	-	DZJC000217	Holder, LCD	1	1	1	1	1	5A
233	-	DZHA000108	Film, Antistatic	1	1	1	1	1	5C
234	-	DZKB000476	Key, Cursor	1	1	1	1	1	2E
234	-	DZKB000589	Key, Cursor	-	-	-	-	-	2E
235	-	DZKP000155	Spring, Plate, Pinch Roller	1	1	1	1	1	3H, 3I
236	-	DZKG000086	Shaft, Plate, Scanning	1	1	1	1	1	6I
237	-	DZJQ000003	Seal, White	1	1	1	1	1	7H
238	-	DZJF000349	Plate, Scanning	1	1	1	1	1	8I
19	-	XTB3+8J	Screw	1	1	1	1	1	2E, 3I
7B	-	XTB26+6J	Screw	1	1	1	1	1	8D

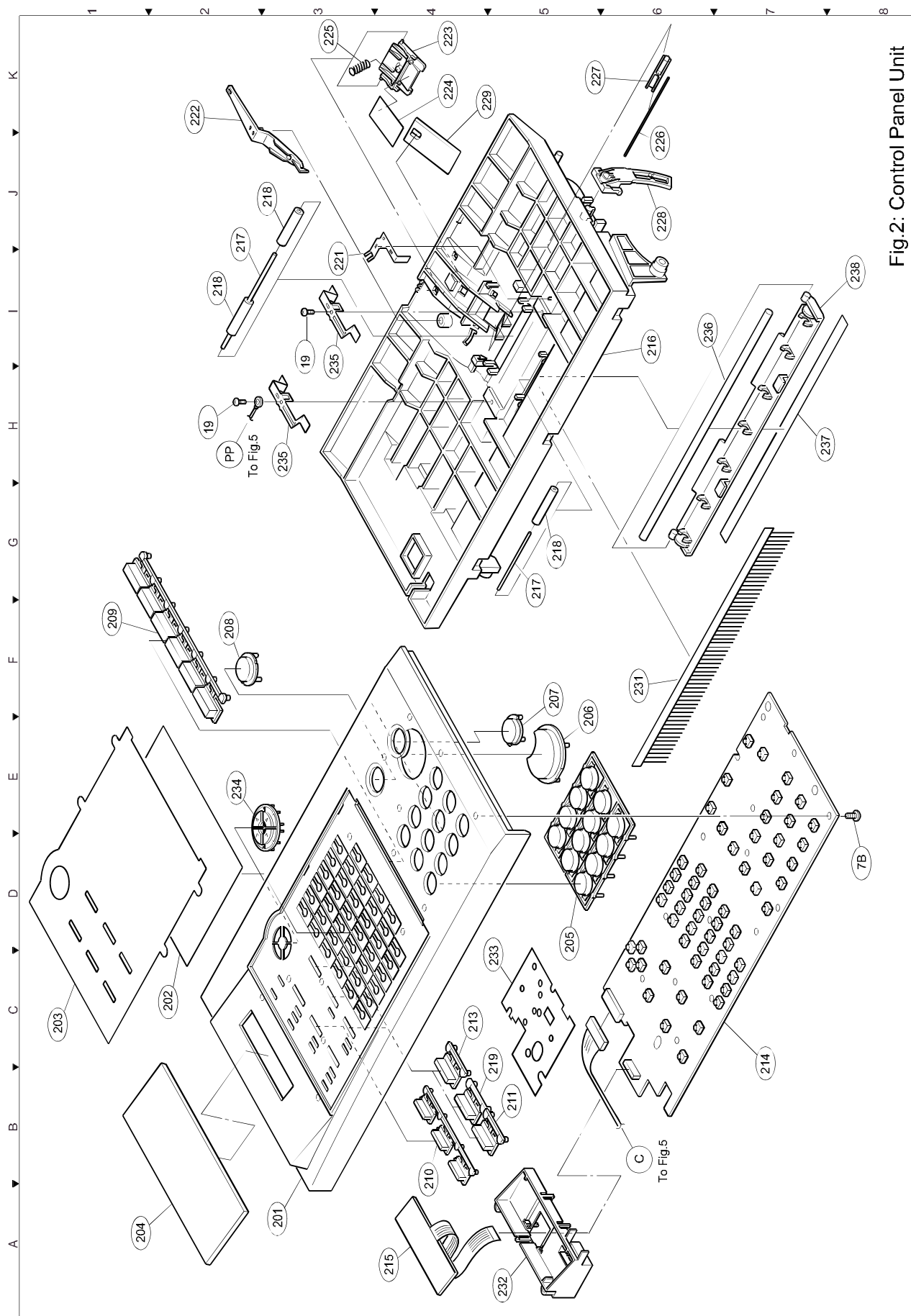


Fig.2: Control Panel Unit

7.4. Transmitter Assembly

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
301	-	DZJB000109	Chassis, Transmitter	1	1	1	1	1	4J
302	-	DZMG000018	Latch	1	1	1	1	1	2G, 5J
303	-	DZKN000154	Spring, Coil, Latch	1	1	1	1	1	2G.5K
304	-	DZHP002388	Bracket A, Motor	1	1	1	1	1	2C
304	-	DZHP002389	Bracket B, Motor	-	-	-	-	-	2C
305	-	DZJM000171	E-Ring, 6	1	1	1	1	1	2A
306	-	DZLF000092	Gear, B44	1	1	1	1	1	3A, 1B, 1C
306	-	DZLF000241	Gear, B44 (Alternate Part)	(1)	(1)	(1)	(1)	(1)	3A, 1B, 1C
307	-	DZLF000086	Gear, B30	1	1	1	1	1	1B, 2A
308	-	DZLF000150	Gear, B58	1	1	1	1	1	2A
309	-	DZLF000085	Gear, B50	1	1	1	1	1	1A
311	-	DZLF000090	Gear, Clutch, B34	1	1	1	1	1	1B
312	-	DZKN000155	Spring, Coil	1	1	1	1	1	1B
313	-	DZJA000142	Bracket, Gear	1	1	1	1	1	1A
314	-	DZLF000116	Gear, Drive, B31B61	1	1	1	1	1	1F
316	-	DZKP000156	Plate A, Ground Spring	1	1	1	1	1	1E
317	-	DZJB000016	Bracket, ADF Gear	1	1	1	1	1	2K
318	-	DZLF000015	Gear, B44	1	1	1	1	1	1J
319	-	DZKN000006	Spring, Coil, Idle Gear	1	1	1	1	1	1K
320	-	DZLF000038	Gear, Intermediate	1	1	1	1	1	1K
321	-	DZLF000149	Gear, ADF	1	1	1	1	1	2K
322	-	DZLA000089	Shaft, ADF	1	1	1	1	1	2K
323	-	DZLA000096	ADF Roller	1	1	1	1	1	2J
324	-	DZKP000167	Plate, Pressure Spring	1	1	1	1	1	1K
325	-	DZLA000014	Roller, Pre-Feed	1	1	1	1	1	1J
326	-	DZLF000115	Gear, Drive, B35	1	1	1	1	1	1G, 4B
327	-	DZLM000050	Bushing, P6L8	1	1	1	1	1	1H, 3J, 4B
328	-	DZLA000165	Roller, Feed	1	1	1	1	1	2I
330	-	DZLA000166	Roller, Eject	1	1	1	1	1	5C
331	-	DZLA000167	Shaft, Idle	1	1	1	1	1	2H
332	-	DZJA000562	Bracket 1, LED Array	1	1	1	1	1	6H
333	-	LN963292UML	LED Array Assembly	1	1	1	1	1	5F
334	-	DZHP001664	Holder, Stamp	1	1	1	1	1	6J
335	-	DZGB000020	Stamp Solenoid	1	1	1	1	1	7J
336	-	DZHT000027	Stamp Head (Blue)	1	1	-	-	-	6J
336	-	DZHT000004	Stamp Head (Pink)	-	-	1	1	1	6J
337	-	DZTC000003	Mirror 1	1	1	1	1	1	7B
338	-	DZTC000002	Mirror 2	1	1	1	1	1	6F
339	-	DZKP000001	Plate Spring, Mirror	1	1	1	1	1	6B, 6E, 7G, 8E
340	-	DZHP002406	Scanner Assembly	1	1	1	1	1	8A
340	-	DZHP002407	Scanner Assembly	-	-	-	-	-	8A
341	-	DZTE000008	Glass, Scanner	1	1	1	1	1	4C
342	-	DZEC100578	CCD PCB Assembly	1	1	1	1	1	7B
344	-	DZLM000046	Bushing, P6	1	1	1	1	1	1B
346	-	DZGG000029	Transmit Motor	1	1	1	1	1	2C
347	-	DZFP000696	Harness, TMOT	1	1	1	1	1	1D
348	-	DZLF000256	Gear, Drive, B18	1	1	1	1	1	3J
349	-	DZLM000086	Bushing, P6L6	1	1	1	1	1	5C
351	-	DZJA000563	Bracket 2, LED Array	1	1	1	1	1	5E
530	-	DZFP000698	Harness, LED	1	1	1	1	1	4E
19	-	XTB3+8J	Screw	1	1	1	1	1	2D, 2I, 2K, 4B, 5D, 6C, 6G, 6I, 7J, 8E
36	-	XYN3+F6	Screw	1	1	1	1	1	1C, 1D
4N	-	XSN3+W8FC	Screw	1	1	1	1	1	8B
9E	-	XTN26+6J	Screw	1	1	1	1	1	5G

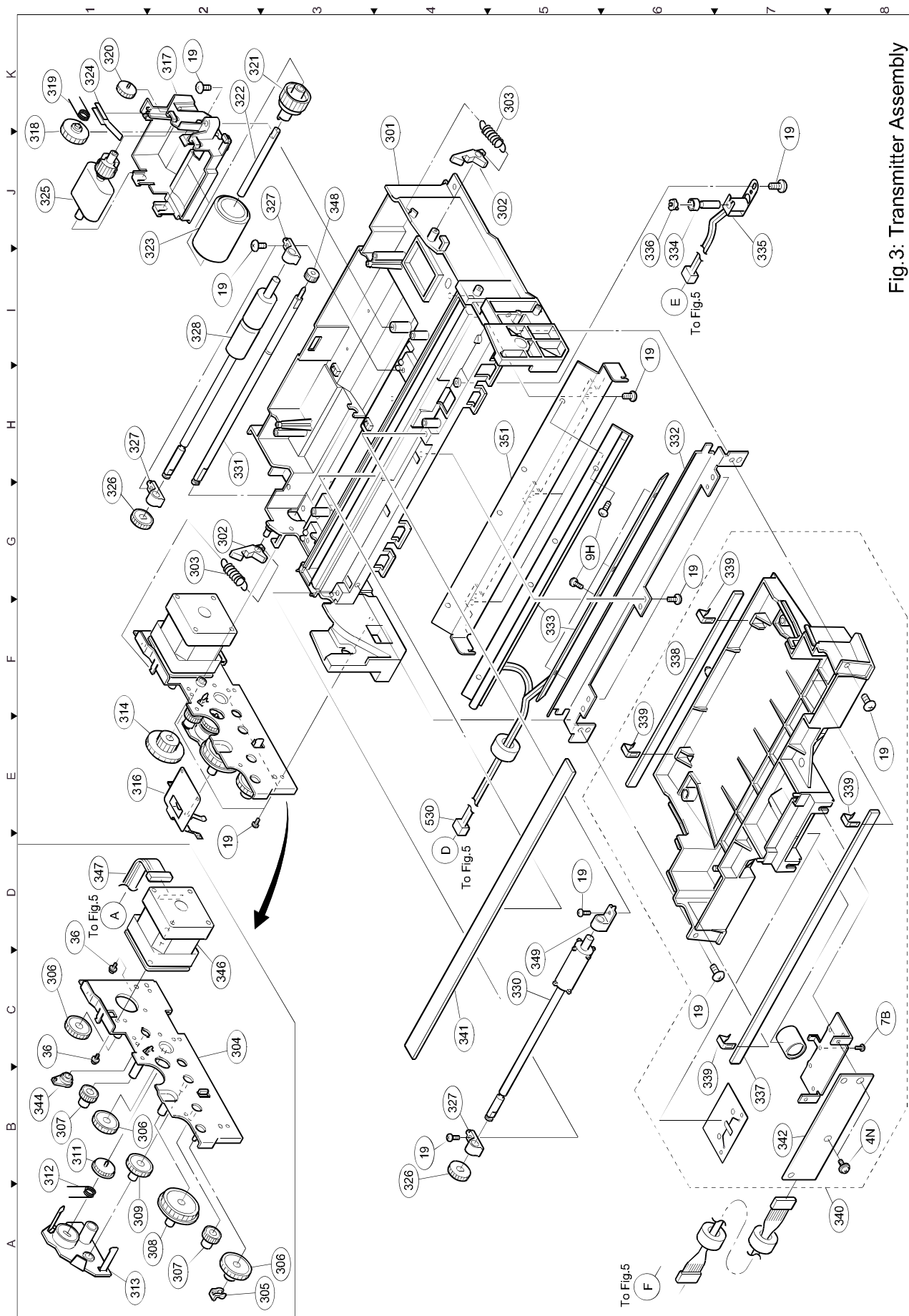


Fig. 3: Transmitter Assembly

7.5. Fuser Unit

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
401	-	DZJB000012	Cover, Fuser	1	1	1	1	1	3E
402	-	DZLA000083	Roller, Idle	1	1	1	1	1	1C, 2D
403	-	DZKR000005	Spring, Pinch Roller	1	1	1	1	1	1C, 1D
404	-	DZJC000082	Terminal C, Fuser Lamp	1	1	1	1	1	1B
405	-	DZGT000010	Thermistor Assembly	1	1	1	1	1	2B
406	-	DZJL000017	Terminal A, Fuser Lamp	1	1	1	1	1	3C
407	-	DZJC000081	Terminal B, Fuser Lamp	1	1	1	1	1	4D
408	-	DZGM000006	Lamp, Fuser(115V)	1	1	-	-	-	4B
408	-	DZGP000001	Lamp, Fuser(220V)	-	-	1	1	1	4B
409	-	DZLA000133	Roller 7, Pressure	1	1	1	1	1	5D
410	-	DZLM000041	Bushing, P6L5.5	1	1	1	1	1	5C, 6E
411	-	DZKK000019	Plate, Pressure Roller	1	1	1	1	1	5C, 7E
412	-	DZKN000068	Spring, Pressure	1	1	1	1	1	5C, 6F
413	-	DZGT000008	Brush, Discharge, Front	1	1	1	1	1	7E
414	-	DZLA000072	Roller, Fuser	1	1	1	1	1	6C
415	-	DZJB000023	Frame, Fuser	1	1	1	1	1	7C
416	-	DZLM000047	Bushing, P17L6.8	1	1	1	1	1	5B, 7E
417	-	DZLF000147	Gear, Drive, E24	1	1	1	1	1	6A
418	-	DZPJ000002	C-Ring	1	1	1	1	1	5A, 7E
419	-	DZLF000148	Gear, E14	1	1	1	1	1	6A, 6B
420	-	DZEC000067	Actuator, Exit, Paper	1	1	1	1	1	7C
422	-	DZLA000078	Roller, Eject	1	1	1	1	1	7B
423	-	DZLM000040	Bushing, P3.5L11.2 (Black)	1	1	1	1	1	8C
424	-	DZLM000039	Bushing, P3.5L11.2 (White)	1	1	1	1	1	6A
425	-	DZLF000129	Gear, E22	1	1	1	1	1	6A
426	-	DZJF000161	Guide, Paper, Lower	1	1	1	1	1	8B
427	-	DZGT000009	Brush, Discharge, Rear	1	1	1	1	1	8A
428	-	DZJF000155	Stay, LSU	1	1	1	1	1	1F
429	-	LPA1601F	Laser Unit	1	1	1	1	1	1J
430	-	DZPF000001	Nut	1	1	1	1	1	1F, 3J
431	-	DZHP000260	Fuser Unit, 115V	1	1	-	-	-	4E
431	-	DZHP000535	Fuser Unit, 220V	-	-	1	1	1	4E
432	-	DZGT000014	Thermostat 2	1	1	1	1	1	3C
433	-	DZGT000013	Thermal Fuse	1	1	1	1	1	4C
434	-	DZNK000036	Caution Label, High Temperature	1	1	1	1	1	1D
19	-	XTB3+8J	Screw	1	1	1	1	1	1G, 1H, 1K, 2E, 8D
23	-	XYN3+F8	Screw	1	1	1	1	1	1B, 2D, 4C, 4D
4N	-	XSN3+W8FC	Screw	1	1	1	1	1	3B, 7B, 7E, 8D
1Q	-	XYN3+F10	Screw	1	1	1	1	1	2A

Note:

If the Thermostat (Ref. No. 432) and/or Thermal Fuse (Ref. No. 433) is damaged by a Fuser over heat condition, the parts marked with """" may also be damaged and should be replaced at the same time as the Thermostat and/or Thermal Fuse or replace the entire Fuser Unit.

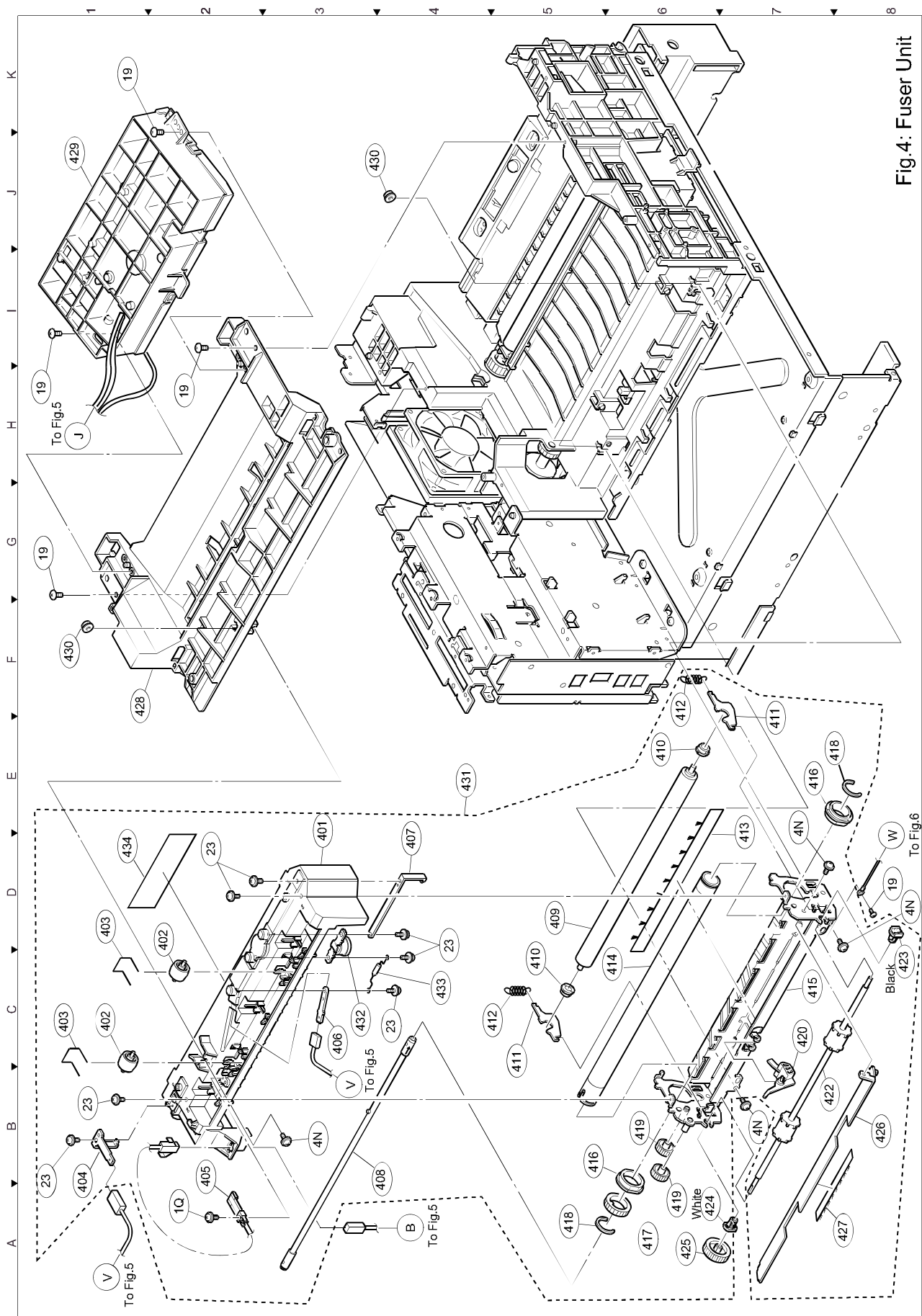


Fig.4: Fuser Unit

7.6. Electrical Parts

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
501	-	DZJA000140	Chassis, Power Supply PCB	1	1	1	1	1	6C
502	△	ETXDN218A7D	PSU, Low Voltage (100V)	1	1	-	-	-	7B
502	△	ETXDN218E7D	PSU, Low Voltage (200V)	-	-	1	1	1	7B
503	-	DZJA000139	Terminal Cover, High Voltage	1	1	1	1	1	7J
504	-	DZKN000069	Spring, Coil	1	1	1	1	1	7J
505	-	DZKN000070	Spring, Coil	1	1	1	1	1	7K
506	-	EUKMBN659EP	PSU, High Voltage	1	1	1	1	1	7I
507	△	DZYNA1556E	PC Board, ACI	1	1	-	-	-	7A
507	△	DZYNA1556G	PC Board, ACI	-	-	1	1	1	7A
508	-	DZEA000124	Shield, Mylar	1	1	1	1	1	7A
509	-	DZJA000610	Bracket, Connection	1	1	1	1	1	6C
510	-	DZJK000032	Harness Tie, Insulated	1	1	1	1	1	4G
511	-	DZJA000570	Bracket, Rear	1	1	1	1	1	5G
512	-	DZJA000495	Bracket, LCU	1	1	1	1	1	4C
513	-	DZJA000567	Bracket, Rail, LCU	1	1	1	1	1	5E
514	-	DZJA000566	Bracket, LPC	1	1	1	1	1	5E
516	-	DZJK000006	Clamp, Harness	1	1	1	1	1	3D, 4D, 5F
519	△	DZYNA1435J	PC Board, LCU	1	1	-	-	-	5D
519	△	DZYNA1436BF	PC Board, LCE	-	-	1	-	-	5D
519	△	DZYNA1436GJ	PC Board, LCE	-	-	-	1	-	5D
519	△	DZYNA1436LD	PC Board, LCE	-	-	-	-	1	5D
520	-	DZJB000116	Duct, Fan	1	1	1	1	1	2D
521	-	DZJF000350	Guide 2, Memory Card	1	1	1	1	1	1A
522	△	DZEC101543	PC Board, FCB (DX-2000AU)	1	-	-	-	-	2A
522	△	DZEC101628	PC Board, FCB (DX-2000AC)	-	1	-	-	-	2A
522	△	DZEC101630	PC Board, FCB (DX-2000AB)	-	-	1	-	-	2A
522	△	DZEC101638	PC Board, FCB (DX-2000AG)	-	-	-	1	-	2A
522	△	DZEC101678	PC Board, FCB (DX-2000AL)	-	-	-	-	1	2A
523	-	DZJA000568	Bracket, FCB	1	1	1	1	1	3B
524	-	DZJB000020	Spacer, FCB PC Board	1	1	1	1	1	3C
525	-	DZJL000023	Plate, Memory Card Ground	1	1	1	1	1	1C
526	-	DZJA000574	Bracket, Fan Duct	1	1	1	1	1	1E
528	-	DZFP000694	Harness, DC Motor	1	1	1	1	1	1F
530	-	DZFP000698	Harness, LED	1	1	1	1	1	1I
531	-	DZFP000699	Harness, SNS	1	1	1	1	1	2I
532	-	DZFP000701	Harness, POW	1	1	1	1	1	2E
533	-	DZFP000210	Harness, HVPS	1	1	1	1	1	8I
535	-	DZFP000572	Harness, SNS	1	1	1	1	1	7D
536	-	DZFP000207	Harness 1, SNS	1	1	1	1	1	2F
537	-	DZFP000697	Harness, LCU	1	1	1	1	1	3K, 5D
538	-	DZFP000742	Harness, SPF	1	1	1	1	1	3K
539	-	DZFP000700	Harness, PNL	1	1	1	1	1	2K
540	-	DZFP000705	Ground Strap	1	1	1	1	1	6F
541	-	DZJK000005	Clamp, Harness	1	1	1	1	1	4D
543	-	DZFP000211	Harness, Fuser Lamp	1	1	1	1	1	8D
544	-	DZFP000693	Harness, LSU	1	1	1	1	1	1F
545	-	DZFP000695	Harness, CCD	1	1	1	1	1	1I
546	-	DZFP000571	Harness, SNS	1	1	1	1	1	3F
547	-	DZJF000195	Guide 1, Memory Card	1	1	1	1	1	1A
548	-	DZFP000753	Harness, Toner Sensor	1	1	1	1	1	2G
549	-	DZFP000702	Harness, LPC	1	1	1	1	1	3J
555	-	DZEC101097	PC Board, LPC	1	1	1	1	1	5E
556	-	DZEA000126	Protector Film, Harness	1	1	1	1	1	4C
557	-	DZJA000600	Bracket, Memory Card	1	1	1	1	1	4E
347	-	DZFP000696	Harness, TMOT	1	1	1	1	1	1I
19	-	XTB3+8J	Screw	1	1	1	1	1	1C, 1D, 2D, 3E, 4F, 4G, 5C, 5E, 5G, 6B, 6E, 7K, 8A, 8K
35	-	XYN4+F6	Screw	1	1	1	1	1	6B
C8	-	XTW3+8SFC	Screw	1	1	1	1	1	2A, 4D, 4E, 6C

7.7. Paper Transportation

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
601	-	DZJB000013	Main Frame	1	1	1	1	1	3E
602	-	DZJB000015	Base Frame	1	1	1	1	1	7E
603	-	DZJA000237	Cassette Rail, Left	1	1	1	1	1	7B
604	-	DZJB000114	Cassette Rail, Right	1	1	1	1	1	7I
605	-	DZJD000024	Stay, Right 500	1	1	1	1	1	5C
606	-	DZJN000015	Rubber Leg	1	1	1	1	1	8I
607	-	DZHP000155	Magnet, Catch	1	1	1	1	1	4B
608	-	DZGT000017	Solenoid, Paper Feed	1	1	1	1	1	3A
609	-	DZKK000020	Actuator, No Paper	1	1	1	1	1	5E
610	-	DZAL000053	Sensor, Timing	1	1	1	1	1	4D, 4F, 7H
611	-	DZLA000081	Roller, Paper Feed	1	1	1	1	1	4E
612	-	DZKG000030	Shaft, Feed Roller	1	1	1	1	1	5E
613	-	DZLM000051	Bushing, P8L18, Front (Black)	1	1	1	1	1	5F
614	-	DZLM000042	Bushing, P8L18, Rear (White)	1	1	1	1	1	4D
615	-	DZLF000131	Gear, E34	1	1	1	1	1	3D
616	-	DZJF000162	Guide, Discharge, Plate	1	1	1	1	1	2I
617	-	DZJL000022	Plate, Discharge	1	1	1	1	1	2H
618	-	DZLA000082	Roller, Feed	1	1	1	1	1	1I
620	-	DZLF000132	Gear, Drive, E34	1	1	1	1	1	1G
621	-	DZYNA1555	PC Board, ILS	1	1	1	1	1	1G
622	-	DZGG000019	Fan Unit	1	1	1	1	1	1E
623	-	DZKP000071	Spring, Ground Plate	1	1	1	1	1	2F
624	-	DZBF000001	Resistor, 200M Ohms, 1/2 Watt	1	1	1	1	1	1F
626	-	DZJF000164	Guide, Transfer, Lower	1	1	1	1	1	7J
627	-	DZKK000021	Actuator, Timing	1	1	1	1	1	7I
629	-	DZKP000077	Guide, BTR	1	1	1	1	1	5J
630	-	DZLA000090	Roller, Bias Transfer (BTR)	1	1	1	1	1	6I
631	-	DZLM000043	Bushing, BTR, Front (Black)	1	1	1	1	1	6J
632	-	DZLF000130	Gear, BTR	1	1	1	1	1	6K
633	-	DZLM000044	Bushing, BTR, Rear (White)	1	1	1	1	1	5H
634	-	DZKN000025	Spring, BTR	1	1	1	1	1	5H, 7K
635	-	DZJF000163	Guide, Transfer, Upper	1	1	1	1	1	5J
636	-	DZLA000080	Roller, Pinch	1	1	1	1	1	5K
637	-	DZKR000003	Spring, Wire, Pinch Roller	1	1	1	1	1	5K
638	-	DZKP000083	Spring, Plate, Toner Sensor	1	1	1	1	1	4K
639	-	DZAN000002	Sensor, Toner	1	1	1	1	1	3J
640	-	DZJB000042	Cover, Toner Sensor	1	1	1	1	1	3K
641	-	DZJA000591	Bracket, Motor	1	1	1	1	1	2A
642	-	DZLF000146	Gear, F36B98	1	1	1	1	1	3B
643	-	DZLF000107	Gear, D25B98	1	1	1	1	1	3D
644	-	DZLF000111	Gear, E32D53	1	1	1	1	1	3C
645	-	DZLF000031	Gear, E29	1	1	1	1	1	3C
646	-	DZLF000113	Gear, E18E27	1	1	1	1	1	3A
647	-	DZLF000108	Gear, E20D70	1	1	1	1	1	2C
648	-	DZLF000110	Gear, E21D70	1	1	1	1	1	2D
649	-	DZKP000080	Spring, Transfer Ground	1	1	1	1	1	1C
650	-	DZGG000012	Printer Motor	1	1	1	1	1	2A
651	-	DZKP000090	Spring, Plate	1	1	1	1	1	3A
652	-	DZFK000001	Washer	1	1	1	1	1	2C
653	-	DZFP000215	Ground Strap	1	1	1	1	1	6K
655	-	DZJC000117	Stopper	1	1	1	1	1	3E
656	-	DZKN000073	Spring, Coil, Clutch	1	1	1	1	1	3D
657	-	DZJB000024	Case, Clutch	1	1	1	1	1	3E
658	-	DZJM000086	Drum, Clutch	1	1	1	1	1	3E
659	-	DZJC000119	Stay, Front	1	1	1	1	1	5G
660	-	DZHP000148	Gear Assembly, Clutch	1	1	1	1	1	4C
662	-	DZNK000481	Caution Label, High Temperature	-	-	1	1	1	5I
663	-	DZKP000091	Spring, Paper Size	1	1	1	1	1	5A
664	-	DZJN000034	Rubber Leg (20)	1	1	1	1	1	8C
665	-	DZEC100410	PC Board, SSN	1	1	1	1	1	5A
666	-	DZJB000117	Plate, Bottom	1	1	1	1	1	8F
667	-	DZLF000285	Gear, F18	1	1	1	1	1	3B
668	-	DZNK000023	Guide, Toner Cartridge	1	1	1	1	1	3J
670	-	DZJH000043	Spacer 2	1	1	1	1	1	6K
671	-	DZPE000001	Nut	1	1	1	1	1	3E, 4F
327	-	DZLM000050	Bushing, P6L8	1	1	1	1	1	2J, 1H
516	-	DZJK000006	Clamp, Harness	1	1	1	1	1	1B, 5B
528	-	DZFP000694	Harness, DC Motor	1	1	1	1	1	1B
531	-	DZFP000699	Harness, SNS	1	1	1	1	1	1F, 6H
535	-	DZFP000572	Harness, SNS	1	1	1	1	1	4C

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
536	-	DZFP000207	Harness 1, SNS	1	1	1	1	1	4E, 5C
548	-	DZFP000753	Harness, Toner Sensor	1	1	1	1	1	3J
19	-	XTB3+8J	Screw	1	1	1	1	1	1A, 1B, 1C, 1H, 1J, 2A, 2B, 2E, 2F, 2H, 2K, 3B, 3E, 3H, 4D, 4F, 4J, 4I, 4K, 5A, 5C, 5J, 6B, 6E, 6J, 7A, 7E, 7F, 8B, 8E, 8H
23	-	XYN3+F8	Screw	1	1	1	1	1	4E
1Y	-	XTB3+10J	Screw	1	1	1	1	1	1D
5Z	-	XUC6	E-Ring	1	1	1	1	1	4C, 4D, 5F
C8	-	XTW3+8SFC	Screw	1	1	1	1	1	4A

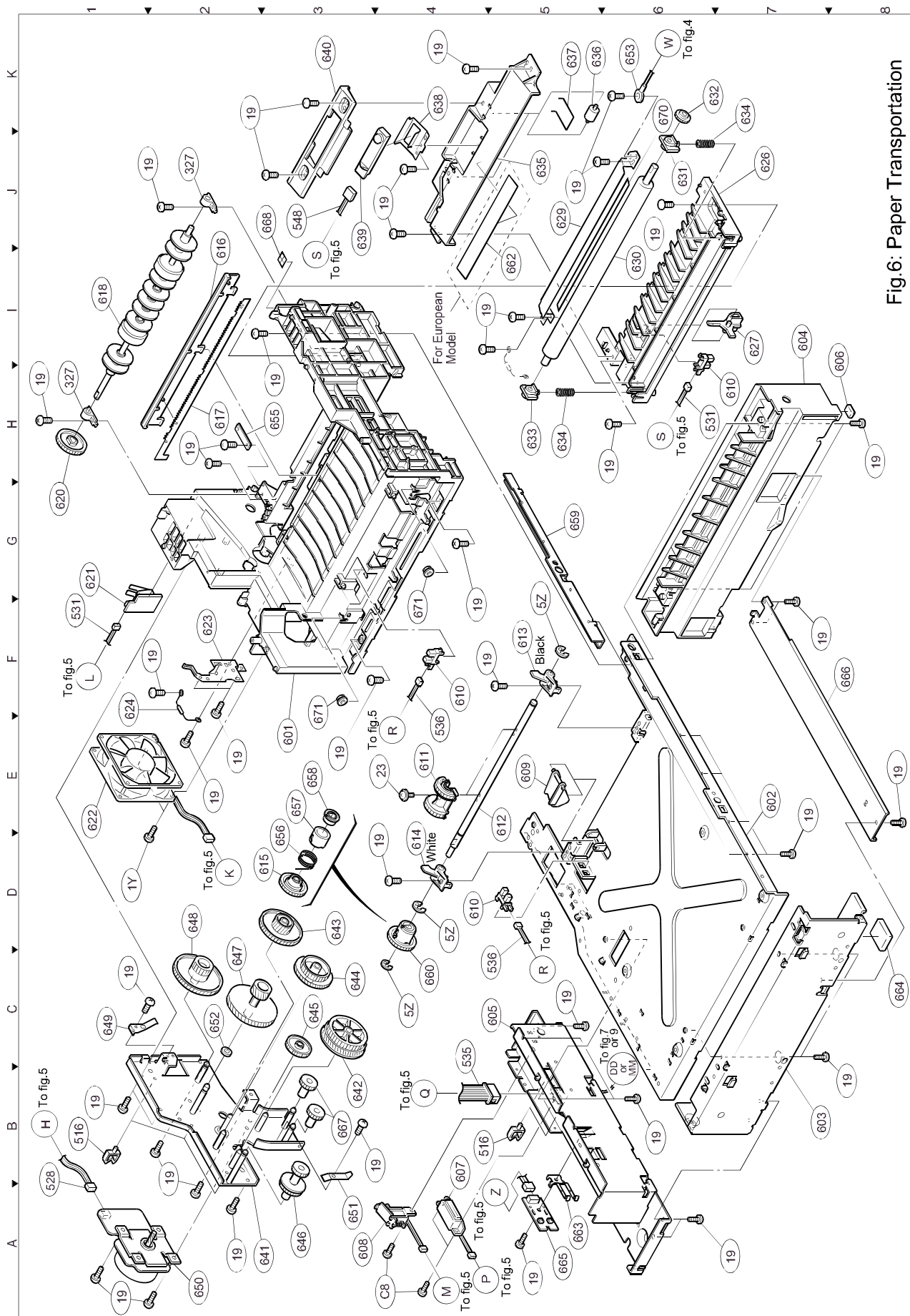
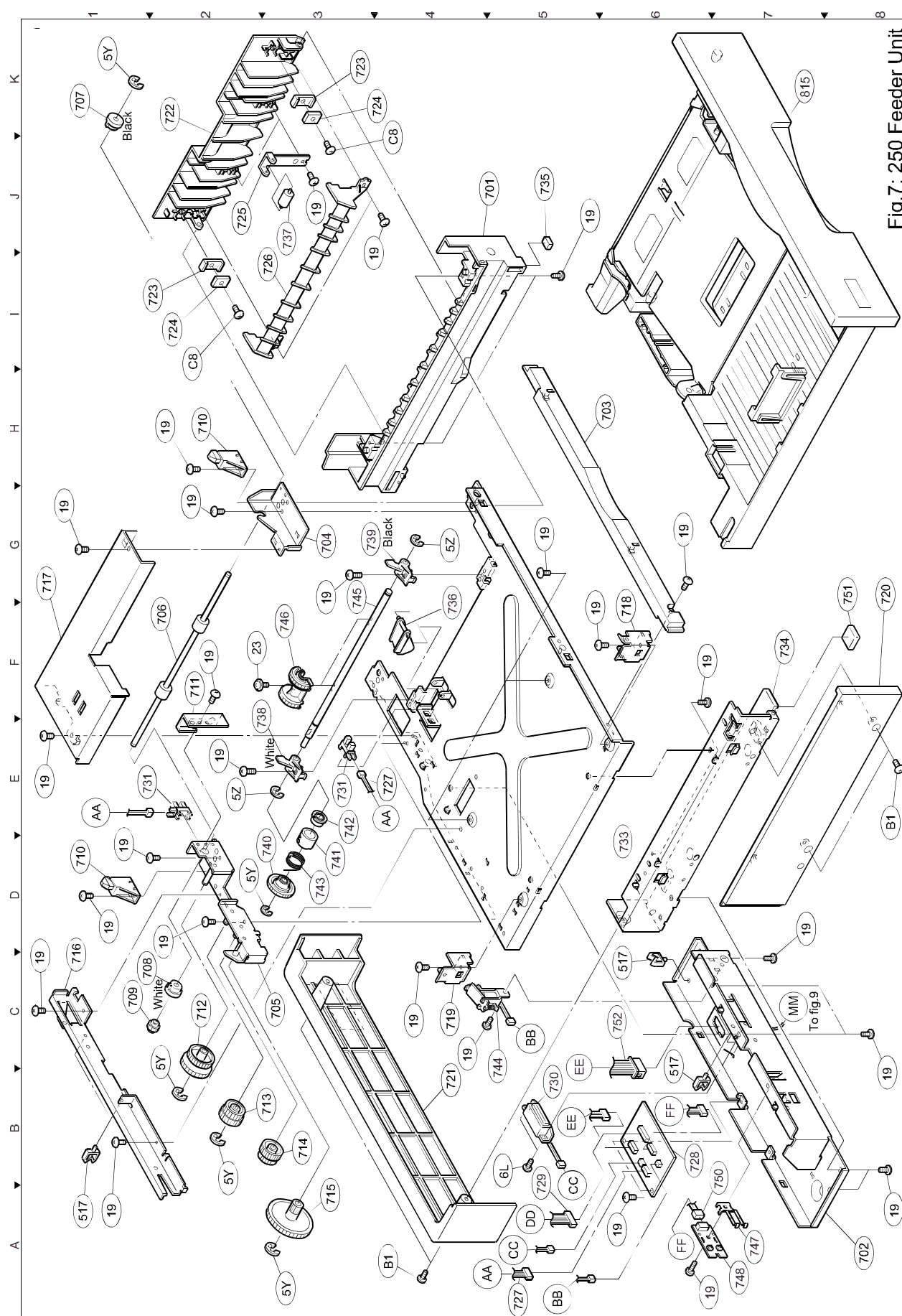


Fig 6: Paper Transportation

7.8. 250 Feeder Unit

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
701	-	DZJA000184	Cassette Rail 2, Right	1	1	1	1	1	5J
702	-	DZJC000092	Stay 2, Rear	1	1	1	1	1	8A
703	-	DZJE000120	Cover, Blind	1	1	1	1	1	6H
704	-	DZJA000175	Bracket, Bushing, Front	1	1	1	1	1	3G
705	-	DZJA000174	Bracket, Bushing, Rear	1	1	1	1	1	3C
706	-	DZLA000087	Roller, Intermediate	1	1	1	1	1	2F
707	-	DZLM000052	P6L5, Front (Black)	1	1	1	1	1	1K
708	-	DZLM000006	P6L5, Rear (White)	1	1	1	1	1	1C
709	-	DZLF000145	Gear, Drive, B28	1	1	1	1	1	1C
710	-	DZJD000004	Latch, Right	1	1	1	1	1	1D, 2H
711	-	DZJE000073	Cover, Sensor	1	1	1	1	1	2F
712	-	DZLF000144	Gear, E34B60	1	1	1	1	1	2C
713	-	DZLF000142	Gear, E17D32	1	1	1	1	1	3B
714	-	DZLF000141	Gear, D26C41	1	1	1	1	1	3B
715	-	DZLF000143	Gear, C21F34	1	1	1	1	1	3A
716	-	DZJE000095	Cover, CST PC Board	1	1	1	1	1	1C
717	-	DZJE000094	Cover, Roller	1	1	1	1	1	1G
718	-	DZJD000005	Bracket, Front	1	1	1	1	1	6F
719	-	DZJD000006	Bracket, Rear	1	1	1	1	1	4C
720	-	DZMA000204	Cover, Cassette, Left	1	1	1	1	1	8G
721	-	DZMA000206	Cover, Cassette, Rear	1	1	1	1	1	4B
722	-	DZJE000092	Cover, Jam Access	1	1	1	1	1	2K
723	-	DZJA000187	Bracket, Magnet	1	1	1	1	1	2I, 3K
724	-	DZGD000001	Magnet	1	1	1	1	1	2I, 3K
725	-	DZKP000084	Spring, Pinch Roller	1	1	1	1	1	2J
726	-	DZJF000218	Guide, Paper	1	1	1	1	1	3I
727	-	DZFP000219	Harness, SNS	1	1	1	1	1	4E, 5A
728	-	DZEC100478	PC Board, CST2	1	1	1	1	1	6B
729	-	DZFP000454	Harness 4, CST	1	1	1	1	1	5A
730	-	DZHP000155	Magnet, Catch	1	1	1	1	1	5B
731	-	DZAL000053	Sensor, No Paper	1	1	1	1	1	2E, 3E
733	-	DZJB000015	Base Frame	1	1	1	1	1	6D
734	-	DZJA000141	Cassette Rail, Left	1	1	1	1	1	7F
735	-	DZJN000015	Rubber Leg	1	1	1	1	1	5J
736	-	DZKK000020	Actuator, No Paper	1	1	1	1	1	4F
737	-	DZLA000080	Roller, Pinch	1	1	1	1	1	3J
738	-	DZLM000042	Bushing, P8L18, Rear (White)	1	1	1	1	1	2F
739	-	DZLM000051	Bushing, P8L18, Front (Black)	1	1	1	1	1	3G
740	-	DZLF000131	Gear, E34	1	1	1	1	1	3D
741	-	DZJB000024	Case, Clutch	1	1	1	1	1	3D
742	-	DZJM000086	Drum, Clutch	1	1	1	1	1	3E
743	-	DZKN000073	Spring, Coil, Clutch	1	1	1	1	1	3D
744	-	DZGT000017	Solenoid, Paper Feed	1	1	1	1	1	5C
745	-	DZKG000030	Shaft, Feed Roller	1	1	1	1	1	3G
746	-	DZLA000081	Roller, Paper Feed	1	1	1	1	1	3F
747	-	DZKP000091	Spring, Paper Size	1	1	1	1	1	7A
748	-	DZEC100410	PC Board, SSN (Paper Size)	1	1	1	1	1	7A
750	-	DZFP000344	Harness 3, SSN	1	1	1	1	1	7B
751	-	DZJN000034	Rubber Leg	1	1	1	1	1	8G
752	-	DZFP000218	Harness 3, CST	1	1	1	1	1	6C
517	-	DZJK000009	Clamp, Harness	1	1	1	1	1	1A, 6B, 6C
815	-	DZHP000358	"Cassette, Paper, 250 (Ref. No. 811 is not included)"	1	1	1	1	1	7K
19	-	XTB3+8J	Screw	1	1	1	1	1	1A, 1C, 1D, 1E, 1G, 2D, 2E, 2F, 2G, 2H, 3G, 3J, 4C, 5F, 5G, 5J, 6A, 6F, 6G, 7D, 8A, 8B
23	-	XYN3+F8	Screw	1	1	1	1	1	2F
5Y	-	XUC4	E-Ring	1	1	1	1	1	1K, 2B, 2C, 2D, 3A
5Z	-	XUC6	E-Ring	1	1	1	1	1	2E, 4G
B1	-	DZPB000007	Screw	1	1	1	1	1	4A, 8E
6L	-	DZPB000014	Screw	1	1	1	1	1	5B
C8	-	XTW3+8SFC	Screw	1	1	1	1	1	2I, 4K



7.9. 250 Paper Cassette

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
801	-	DZJF000194	Base Frame, Cassette	1	1	1	1	1	7F
802	-	DZJF000159	Guide, Paper Width	1	1	1	1	1	5I
803	-	DZJF000160	Guide, Paper Length	1	1	1	1	1	4B
804	-	DZJM000091	Lock, Pressure Plate	1	1	1	1	1	3F
805	-	DZJC000079	Clip, Paper, Right	1	1	1	1	1	3D
806	-	DZJC000080	Clip, Paper, Left	1	1	1	1	1	4E
807	-	DZJD000003	Plate, Lock	1	1	1	1	1	4D
808	-	DZKM000008	Plate, Pressure	1	1	1	1	1	2G
809	-	DZKN000071	Spring	1	1	1	1	1	3E, 4G
810	-	DZJF000005	Pad, Pressure Plate	1	1	1	1	1	1G
811	-	DZKN000298	Label, Paper Size	1	1	1	1	1	8G
812	-	DZKN000084	Spring, Lock	1	1	1	1	1	3F
813	-	DZKN000483	Instruction Label 3	1	1	1	1	1	7B
814	-	DZKN000300	Instruction Label 2	1	1	1	1	1	3I
816	-	DZJF000225	Paper Size Selector	1	1	1	1	1	4C
817	-	DZPA000024	Screw, Locking	1	1	1	1	1	1E

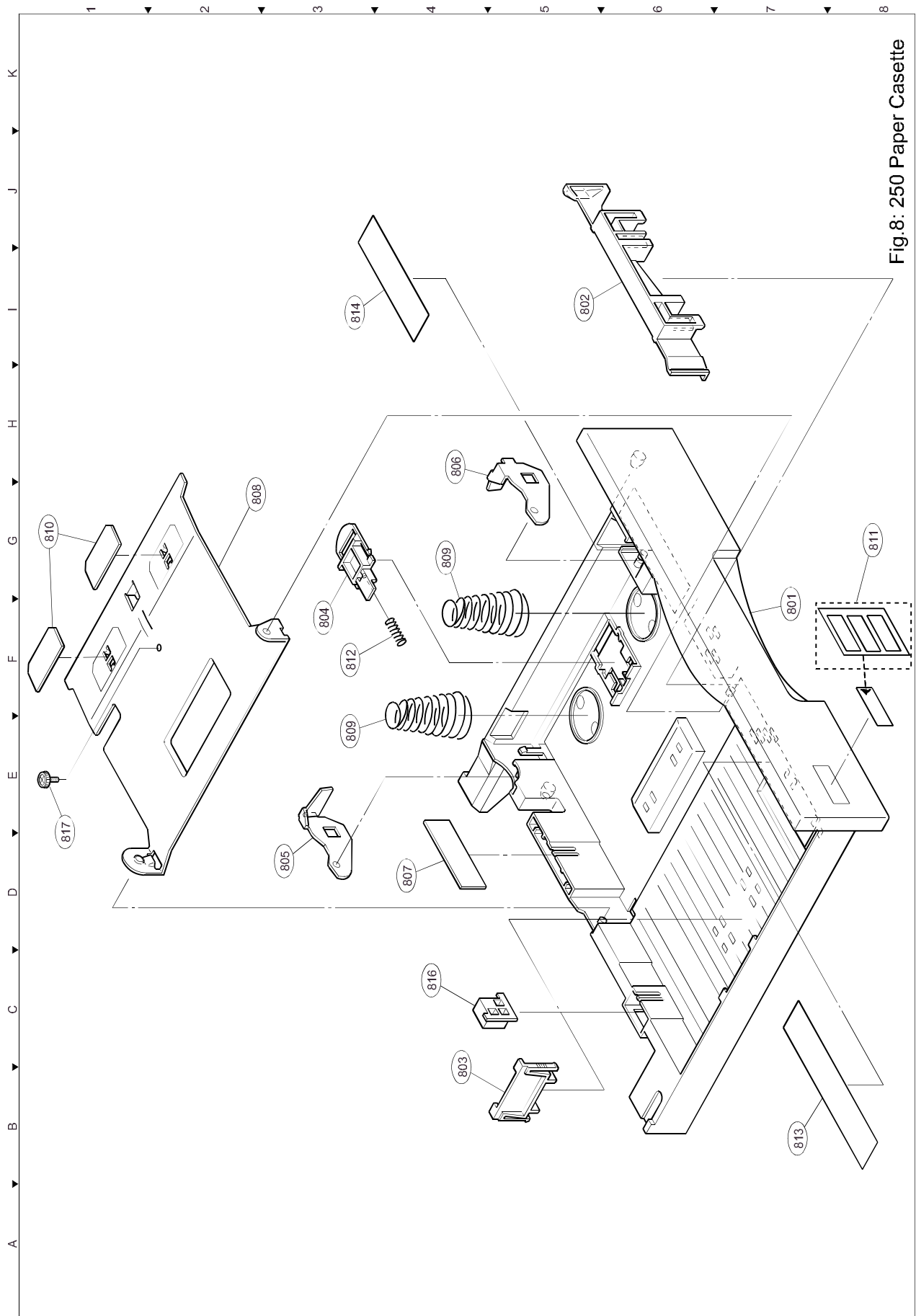
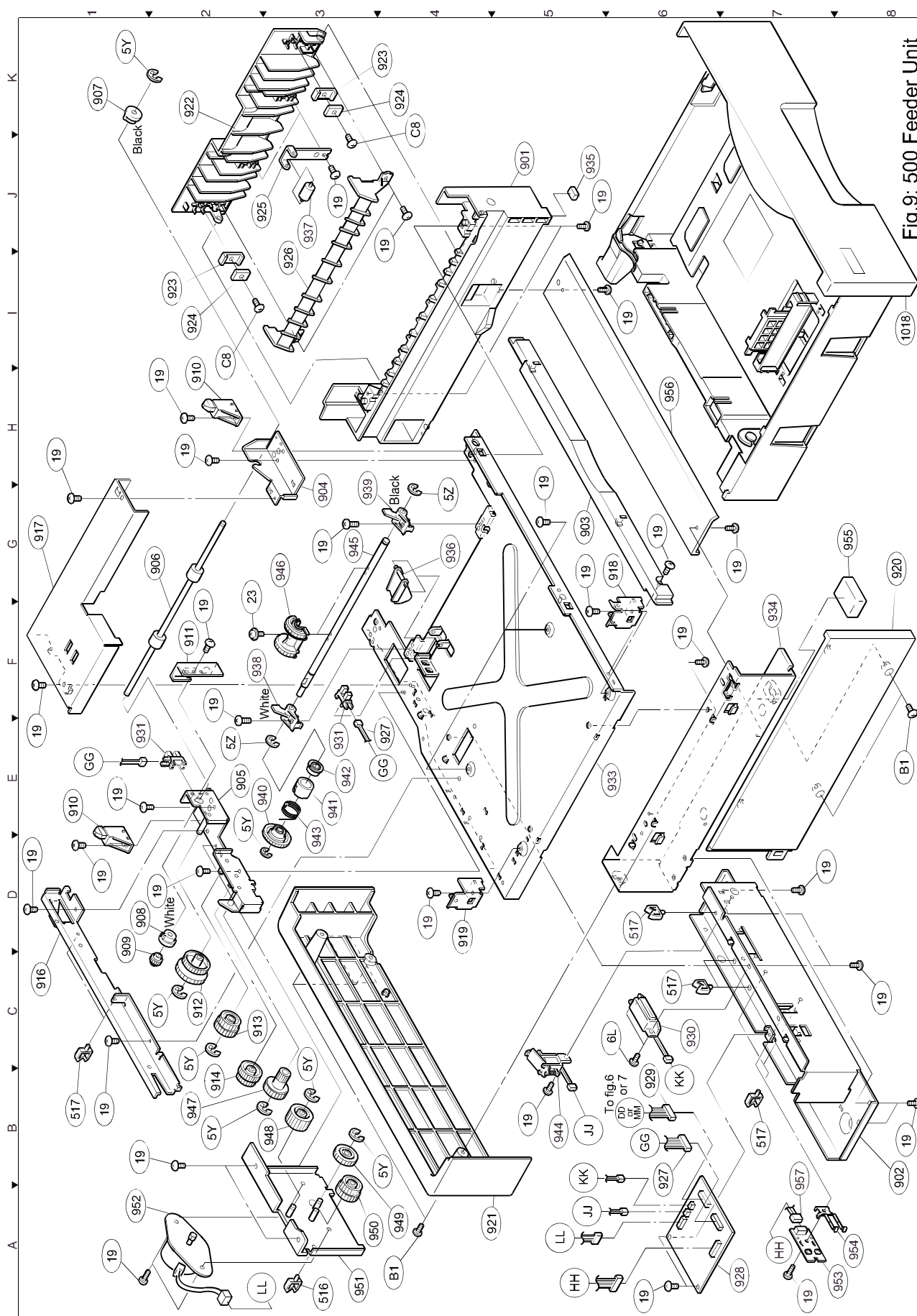


Fig.8: 250 Paper Cassette

7.10. 500 Feeder Unit

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
901	-	DZJA000235	Cassette Rail, Right 500	1	1	1	1	1	5J
902	-	DZJC000121	Stay, Rear 500	1	1	1	1	1	8A
903	-	DZJE000120	Cover, Blind	1	1	1	1	1	5G
904	-	DZJA000175	Bracket, Bushing, Front	1	1	1	1	1	3G
905	-	DZJA000174	Bracket, Bushing, Rear	1	1	1	1	1	2E
906	-	DZLA000087	Roller, Intermediate	1	1	1	1	1	2G
907	-	DZLM000052	Bushing, Conductive, P6L5, Front (Black)	1	1	1	1	1	1K
908	-	DZLM000006	Bushing, P6L5, Rear (White)	1	1	1	1	1	1D
909	-	DZLF000145	Gear, Drive, B28	1	1	1	1	1	1D
910	-	DZJD000004	Latch, Right	1	1	1	1	1	1E, 2E
911	-	DZJE000073	Cover, Sensor	1	1	1	1	1	2F
912	-	DZLF000144	Gear, E34B60	1	1	1	1	1	2C
913	-	DZLF000142	Gear, E17D32	1	1	1	1	1	2C
914	-	DZLF000141	Gear, D26C41	1	1	1	1	1	2B
916	-	DZJE000095	Cover, CST PC Board	1	1	1	1	1	1C
917	-	DZJE000094	Cover, Roller	1	1	1	1	1	1G
918	-	DZJD000005	Bracket, Front	1	1	1	1	1	6G
919	-	DZJD000006	Bracket, Rear	1	1	1	1	1	4D
920	-	DZMA000331	Cover, Cassette, Left 500	1	1	1	1	1	8G
921	-	DZMA000333	Cover, Cassette, Rear 500	1	1	1	1	1	4A
922	-	DZJE000092	Cover, Jam Access	1	1	1	1	1	2K
923	-	DZJA000187	Bracket, Magnet	1	1	1	1	1	2I, 4K
924	-	DZGD000001	Magnet	1	1	1	1	1	2I, 4K
925	-	DZKP000084	Spring, Pinch Roller	1	1	1	1	1	2J
926	-	DZJF000218	Guide, Paper	1	1	1	1	1	3I
927	-	DZFP000346	Harness, CST3 & SNS	1	1	1	1	1	4E, 6A
928	-	DZEC100411	PC Board, CST3	1	1	1	1	1	7A
929	-	DZFP000455	Harness 2, CST3	1	1	1	1	1	6B
930	-	DZHP000155	Magnet, Catch	1	1	1	1	1	6C
931	-	DZAL000053	Sensor, No Paper	1	1	1	1	1	1E, 3E
933	-	DZJB000015	Base Frame	1	1	1	1	1	6E
934	-	DZJA000141	Cassette Rail, Left	1	1	1	1	1	7F
935	-	DZJN000015	Rubber Leg	1	1	1	1	1	5J
936	-	DZKK000020	Actuator, No Paper	1	1	1	1	1	4G
937	-	DZLA000080	Roller, Pinch	1	1	1	1	1	3J
938	-	DZLM000042	Bushing, P8L18, Rear (White)	1	1	1	1	1	2F
939	-	DZLM000051	Bushing, P8L18, Front (Black)	1	1	1	1	1	3G
940	-	DZLF000131	Gear, E34	1	1	1	1	1	2E
941	-	DZJB000024	Case, Clutch	1	1	1	1	1	3E
942	-	DZJM000086	Drum, Clutch	1	1	1	1	1	3E
943	-	DZKN000073	Spring, Coil, Clutch	1	1	1	1	1	3D
944	-	DZGT000017	Solenoid, Paper Feed	1	1	1	1	1	5B
945	-	DZKG000030	Shaft, Feed Roller	1	1	1	1	1	3G
946	-	DZLA000081	Roller, Paper Feed	1	1	1	1	1	3G
947	-	DZLF000171	Gear, C21E28	1	1	1	1	1	2B
948	-	DZLF000036	Gear, E25	1	1	1	1	1	3B
949	-	DZLF000089	Gear, B20B42	1	1	1	1	1	4A
950	-	DZLF000172	Gear, B42E27	1	1	1	1	1	3A
951	-	DZJA000238	Bracket, Motor	1	1	1	1	1	3A
952	-	55SFM25D7B	Motor, Paper Feed	1	1	1	1	1	1A
953	-	DZEC100410	PC Board, SSN (Paper Size)	1	1	1	1	1	8A
954	-	DZKP000091	Spring, Paper Size	1	1	1	1	1	8A
955	-	DZJN000034	Rubber Leg	1	1	1	1	1	8G
956	-	DZJB000044	Stay, Under, 500	1	1	1	1	1	6E
957	-	DZFP000344	Harness, CST3	1	1	1	1	1	7A
516	-	DZJK000006	Clamp, Harness	1	1	1	1	1	3A
517	-	DZJK000009	Clamp, Harness	1	1	1	1	1	1B, 6C, 6D, 7B
1018	-	DZHP000359	"Cassette, Paper, 500 (Ref. No. 1011 is not included)"	1	1	1	1	1	8I
19	-	XTB3+8J	Screw	1	1	1	1	1	1A, 1B, 1D, 1E, 1F, 2D, 2F, 2E, 3G, 3J, 4D, 4J, 5B, 5G, 5J, 6A, 6F, 6G, 6I, 7A, 7D, 7G, 8B, 8C
23	-	XYN3+F8	Screw	1	1	1	1	1	2G
5Y	-	XUC4	E-Ring	1	1	1	1	1	1K, 2B, 2C, 2E, 3B, 4B
5Z	-	XUC6	E-Ring	1	1	1	1	1	2E, 4G
B1	-	DZPB000007	Screw	1	1	1	1	1	4A, 8E
6L	-	DZPB000014	Screw	1	1	1	1	1	6C
C8	-	XTW3+88FC	Screw	1	1	1	1	1	2I, 4J



7.11. 500 Paper Cassette

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
1001	-	DZJF000232	Base Frame, Cassette	1	1	1	1	1	7C
1002	-	DZJF000228	Guide, Paper Width	1	1	1	1	1	7J
1004	-	DZJM000091	Lock, Pressure Plate	1	1	1	1	1	3G
1005	-	DZJC000079	Clip, Paper, Right	1	1	1	1	1	4E
1006	-	DZJC000080	Clip, Paper, Left	1	1	1	1	1	4I
1007	-	DZJD000003	Plate, Lock	1	1	1	1	1	4D
1008	-	DZJF000231	Plate, Pressure	1	1	1	1	1	3F
1009	-	DZKN000093	Spring	1	1	1	1	1	3G
1010	-	DZJP000005	Pad, Pressure Plate	1	1	1	1	1	1G
1011	-	DZNK000298	Label, Paper Size	1	1	1	1	1	8H
1012	-	DZKN000084	Spring, Lock	1	1	1	1	1	3G
1013	-	DZNK000483	Instruction Label 3	1	1	1	1	1	2I
1014	-	DZNK000300	Instruction Label 2	1	1	1	1	1	5J
1015	-	DZJF000225	Paper Size Selector	1	1	1	1	1	4D
1016	-	DZJF000229	Guide A, End	1	1	1	1	1	3B
1017	-	DZJF000230	Guide B, End	1	1	1	1	1	1B
1019	-	DZFA000024	Screw, Locking	1	1	1	1	1	1E

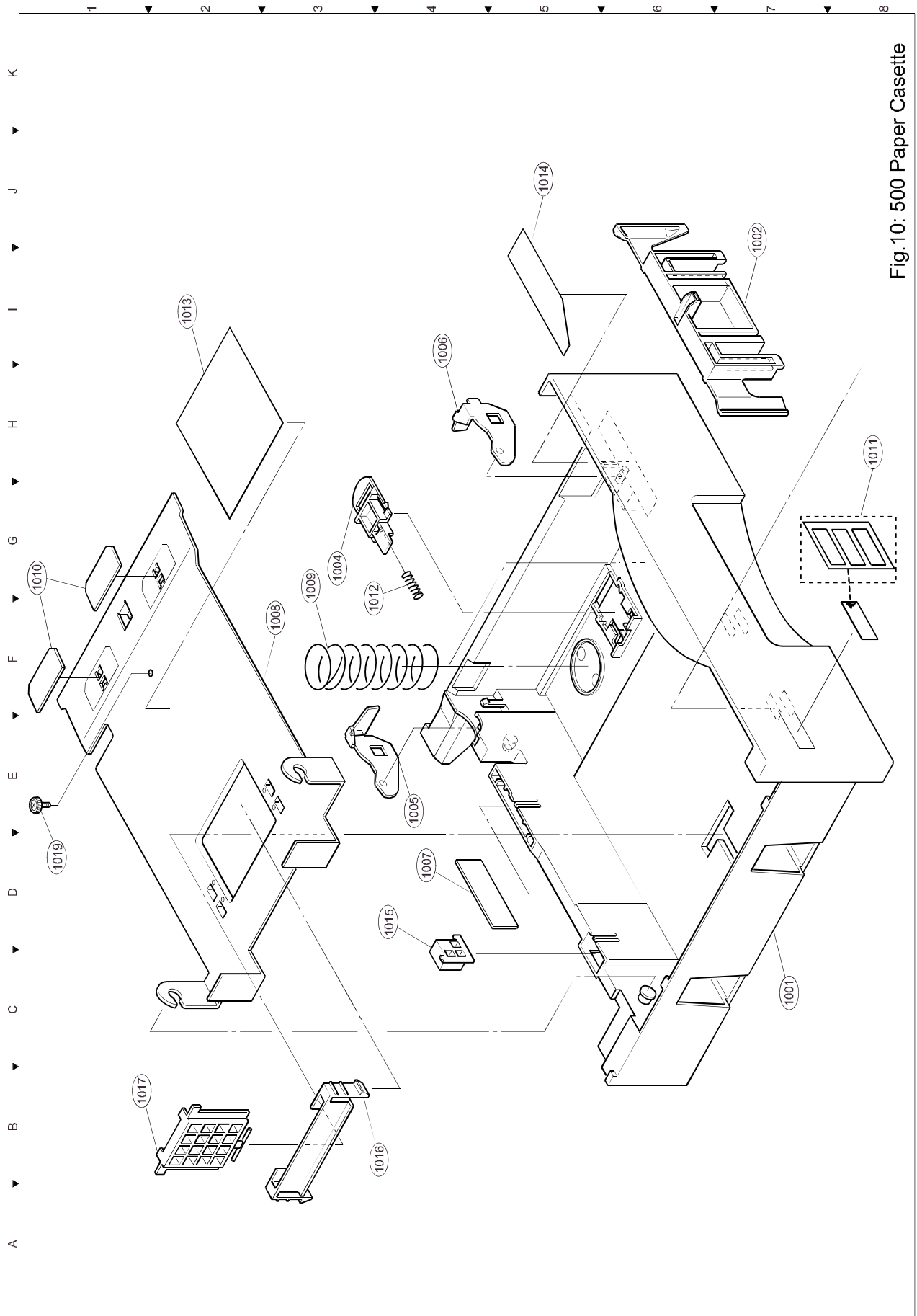


Fig.10: 500 Paper Cassette

7.12. Internet Module

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
1101	-	DZEC101542	PC Board, LANC	1	1	-	-	-	2G
1101	-	DZEC101375	PC Board, LANC	-	-	1	1	1	2G
1102	-	DZEC101298	PC Board, LANB	1	1	-	-	-	3C
1102	-	DZEC101676	PC Board, LANB	-	-	1	1	1	3C
1103	-	DZJE000698	Enclosure, Internet	1	1	1	1	1	6G
1104	-	DZEC101546	PC Board, FRM	1	-	-	-	-	2E
1104	-	DZEC101634	PC Board, FRM	-	1	-	-	-	2E
1104	-	DZEC101636	PC Board, FRM	-	-	1	-	-	2E
1104	-	DZEC101637	PC Board, FRM	-	-	-	1	-	2E
1104	-	DZEC101677	PC Board, FRM	-	-	-	-	1	2E
1105	-	DZFF000794	Harness, LANC	1	1	1	1	1	3G
1106	-	DZJH000002	Spacer, FRM	1	1	1	1	1	2D, 2E
1107	-	DZNK002478	Label, Internet	1	1	1	1	1	5E
1108	-	DZFF000796	Harness, LANB	1	1	1	1	1	4C
1109	-	DZJM000368	Sheild, Mylar	-	-	1	1	1	4C
23	-	XYN3+F8	Screw	1	1	1	1	1	3C, 3D, 3E, 2H, 2I

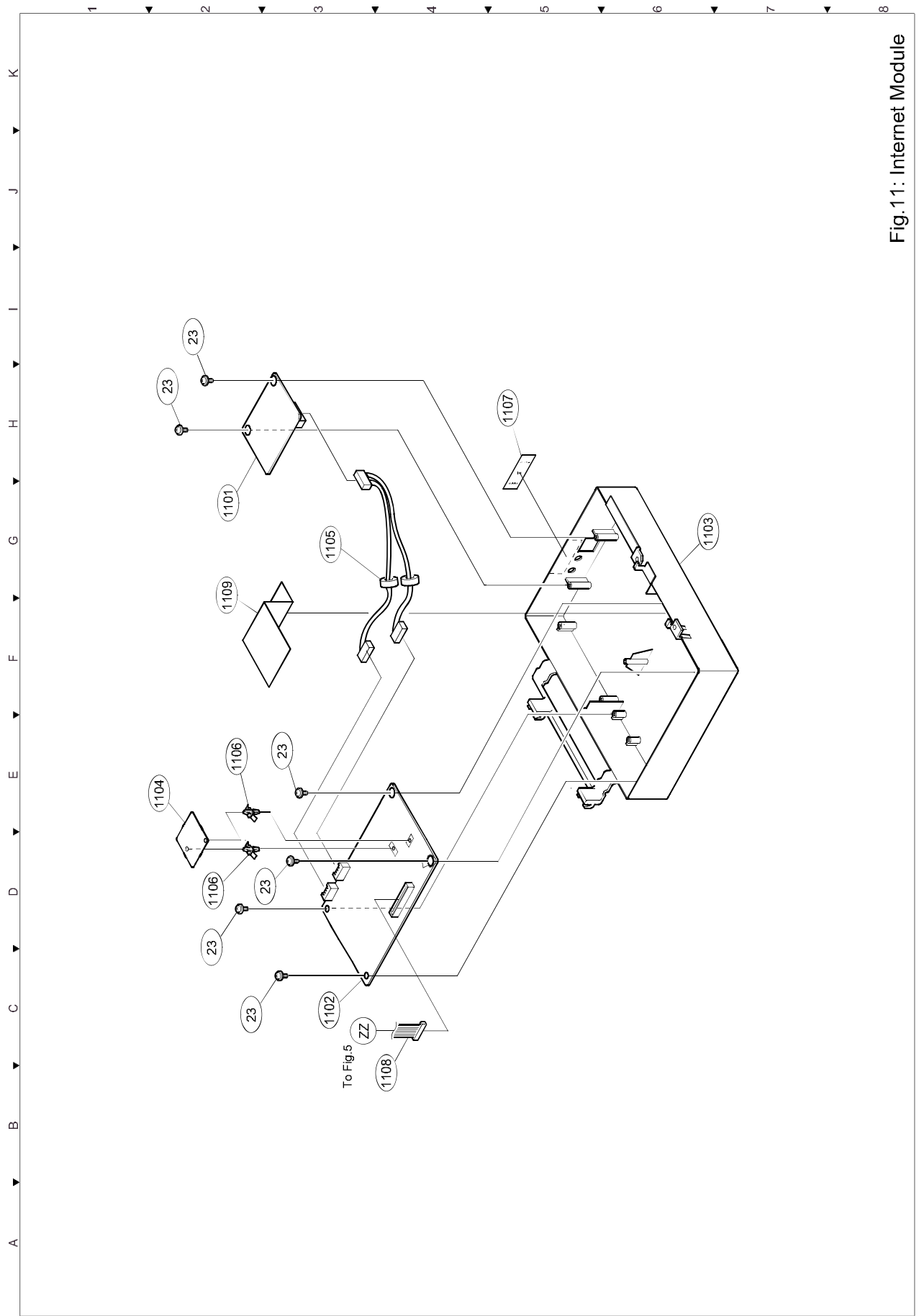


Fig.11: Internet Module

7.13. Packing

Ref. No.	Safety Mark	Part Number	Part Name	AU	AC	AB	AG	AL	Location
1201	-	DZRB000444	Carton	1	1	1	1	1	6E
1202	-	DZRH000248	Assembly, Cushion	1	1	1	1	1	2D, 3E, 5C, 5E
1205	-	DZSD000989	User's Guide (English)	1	1	-	-	-	6B
1205	-	DZSD000990	Quick Guide (English)	1	1	-	-	-	6B
1205	-	DZSD001002	User's Guide (Canadian French)	-	1	-	-	-	6B
1205	-	DZSD001004	Quick Guide (Canadian French)	-	1	-	-	-	6B
1205	-	DZSD001005	User's Guide	-	-	1	-	-	6B
1205	-	DZSD001007	Quick Guide	-	-	1	-	-	6B
1205	-	DZSD001001	User's Guide	-	-	-	1	-	6B
1205	-	DZSD001003	Quick Guide	-	-	-	1	-	6B
1205	-	DZSD001006	User's Guide	-	-	-	-	1	6B
1205	-	DZSD001008	Quick Guide	-	-	-	-	1	6B
1206	-	DZMC000101	Tray, Recording Paper	1	1	1	1	1	5B
1207	-	DZFN000009	Telephone Line Cable	1	1	-	-	-	4A
1207	-	DZFN000023	Telephone Line Cable	-	-	-	1	-	4A
1207	-	DZFN000017	Telephone Line Cable	-	-	-	-	1	4A
1207	-	DZFB000002	AUS Plug	-	-	-	-	1	4A
1207	-	DZFB000010	AUS Plug	-	-	-	-	(1)	4A
1207	-	DZFB000009	AUS Plug	-	-	-	-	(1)	4A
1207	-	DZFN000069	Telephone Line Cable	-	-	-	(1)	-	4A
1207	-	DZFN000006	Telephone Line Cable	-	-	1	-	-	4A
1208	⚠	DZFM000004	Power Cord	-	-	-	1	-	4A
1208	⚠	DZFM000012	Power Cord	-	-	-	(1)	-	4A
1208	⚠	DZFM000028	Power Cord	-	-	-	(1)	-	4A
1208	⚠	DZFM000018	Power Cord	1	1	-	-	-	4A
1208	⚠	DZFM000003	Power Cord	(1)	(1)	-	-	-	4A
1208	⚠	DZFM000027	Power Cord	(1)	(1)	-	-	-	4A
1208	⚠	DZFM000017	Power Cord	-	-	1	-	-	4A
1208	⚠	DZFM000029	Power Cord	-	-	(1)	-	-	4A
1208	⚠	DZFM000009	Power Cord	-	-	-	-	1	4A
1208	⚠	DZFM000031	Power Cord	-	-	-	-	(1)	4A
1209	-	DZRD000008	Box, Accessories	1	1	1	1	1	7B
1213	-	CR2032	Battery	1	1	1	1	1	3A
1214	-	DZJC000236	Holder, Battery	1	1	1	1	1	3A
1215	-	N/A	(See Ref. No. 138 and 139)	1	1	1	1	1	5B
1216	-	DZFS000001	Cable, LAN	-	-	1	1	1	2E

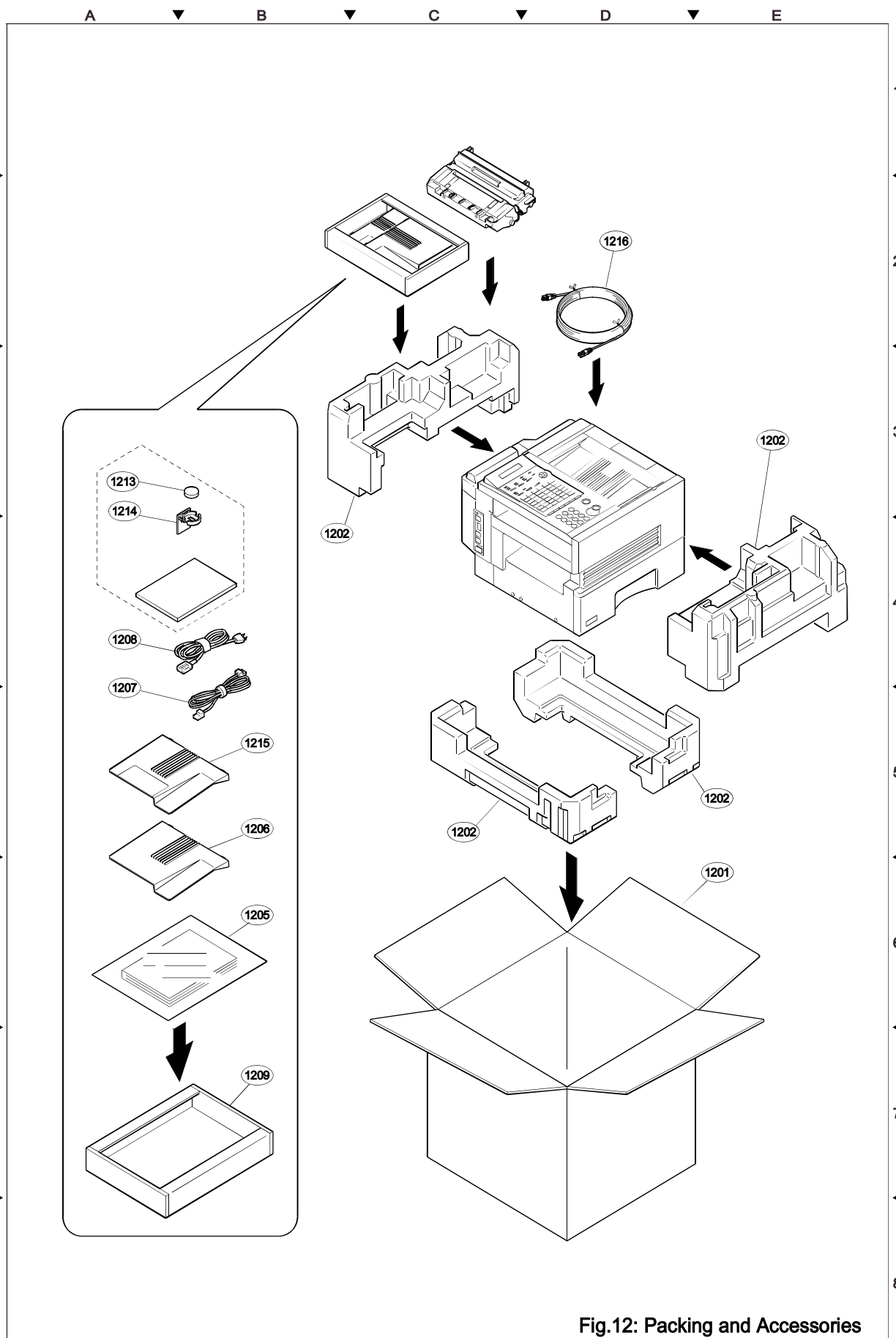
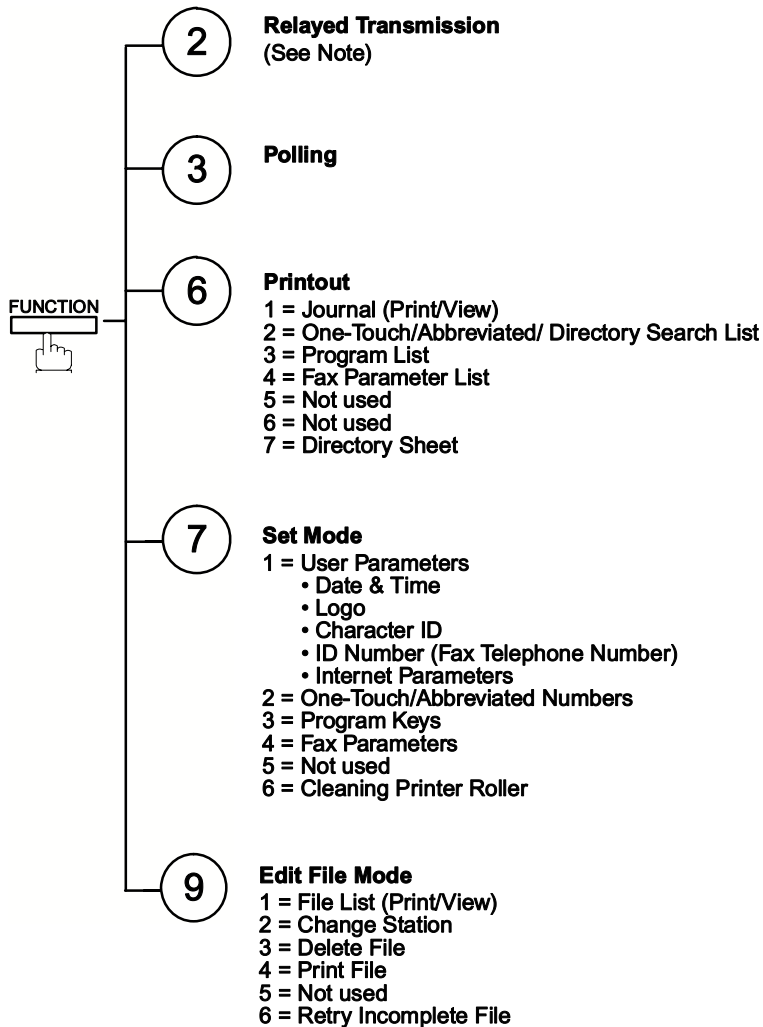


Fig.12: Packing and Accessories

8 Installation

8.1. Function Key

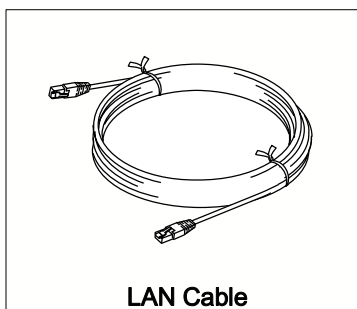
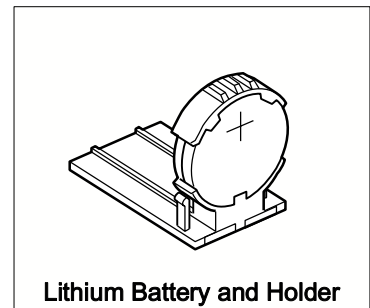
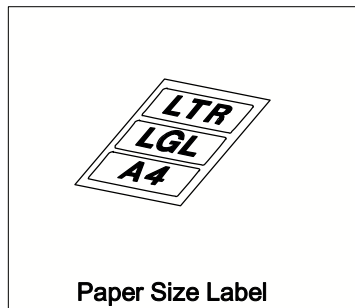
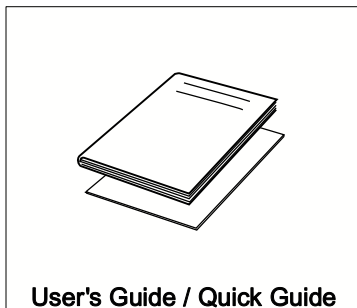
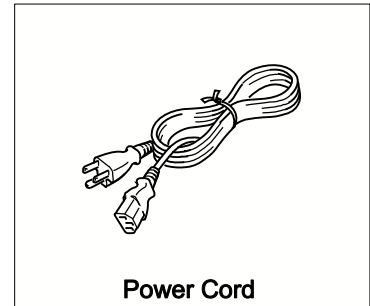
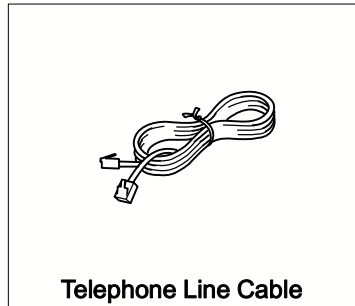
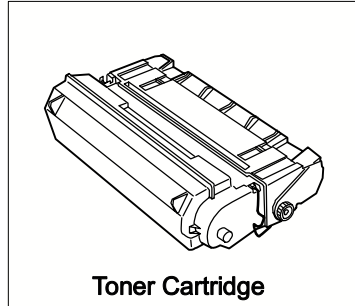
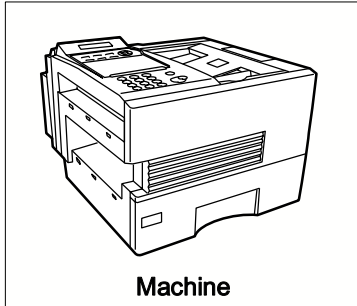
Any function can be started by first pressing **FUNCTION** and then enter the function number, or by pressing ▼ or ▲ scroll key repeatedly until the desired function appears on the display.



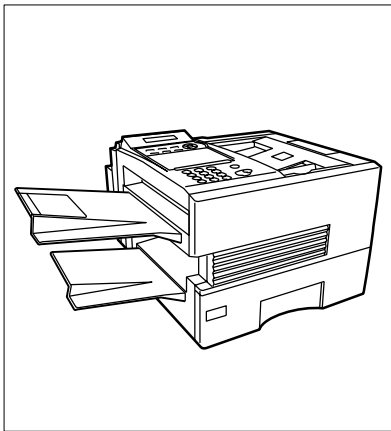
Note: 1. If Fax Parameter is not preset to a Valid position, which enables you to use the function, the display will not show the function.

8.2. Main Unit and Accessories

Unpack the carton and check that you have all the illustrated accessories.



8.3. Installing the Accessories

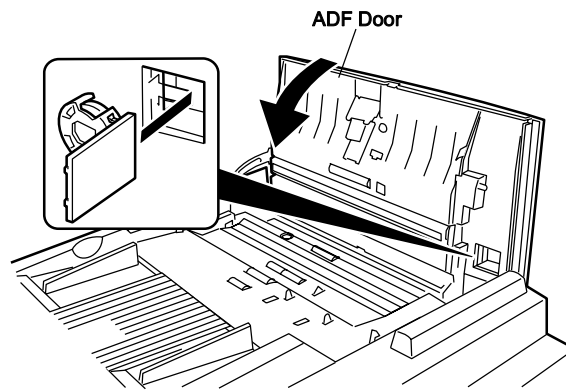


Final Installed View

Installing the Lithium Battery

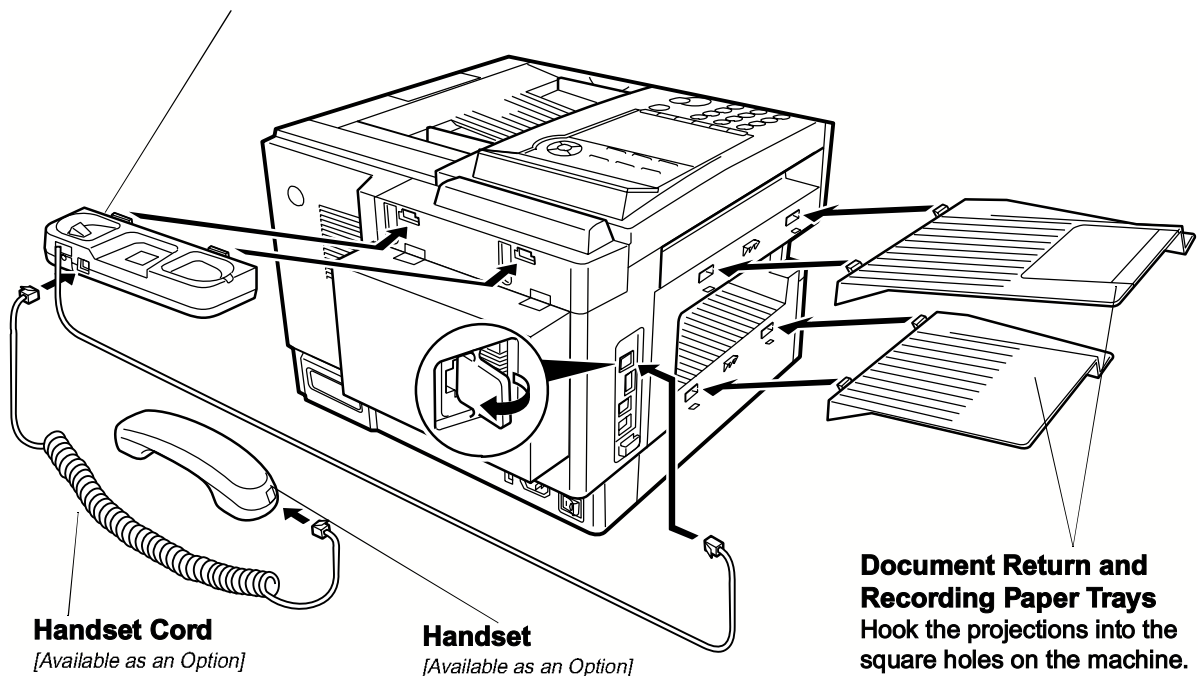
(This battery is used to backup the clock during power failures, see the User's Guide.)

- (1) Open the ADF Door.
- (2) Install the Battery Holder, slide it to the Left until it latches and close the ADF Door.



Handset Cradle *[Available as an Option]*

Hook the projections into the square holes on the machine.
Connect the cable into the HANDSET jack on the machine.



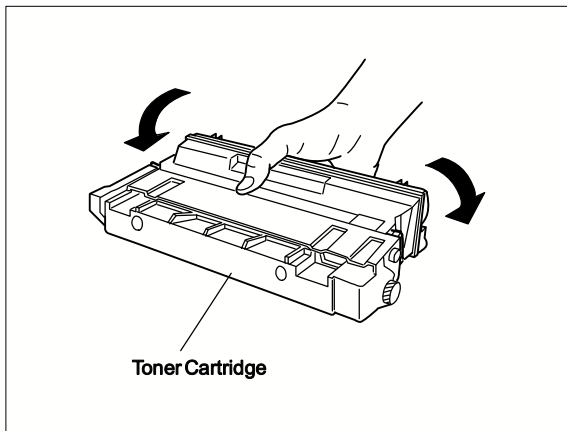
Handset Cord
[Available as an Option]

Handset
[Available as an Option]

**Document Return and
Recording Paper Trays**
Hook the projections into the
square holes on the machine.

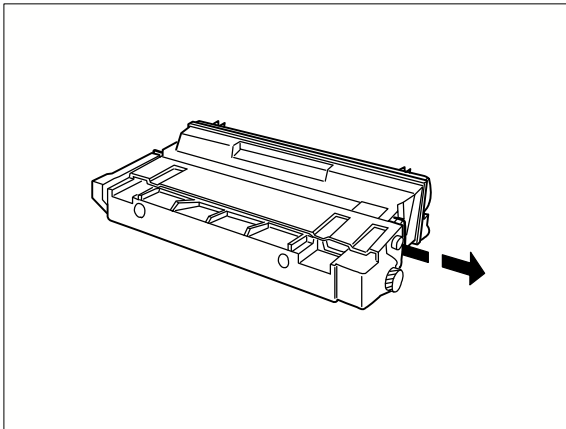
8.4. Installing the Toner Cartridge

1



Unpack the Toner Cartridge and rock it back and forth as shown for 5 or 6 times to even the toner inside.

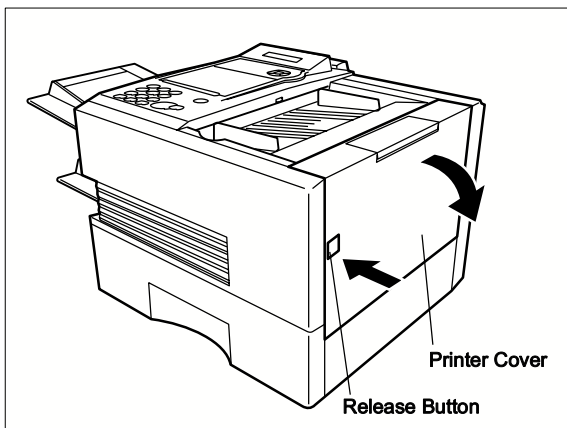
2



Remove the protective seal.

Note: Pull on the seal slowly and straight out.

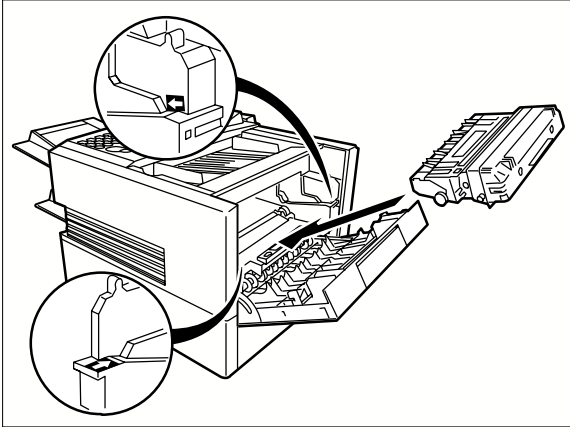
3



Push the Release Button to open the Printer Cover.

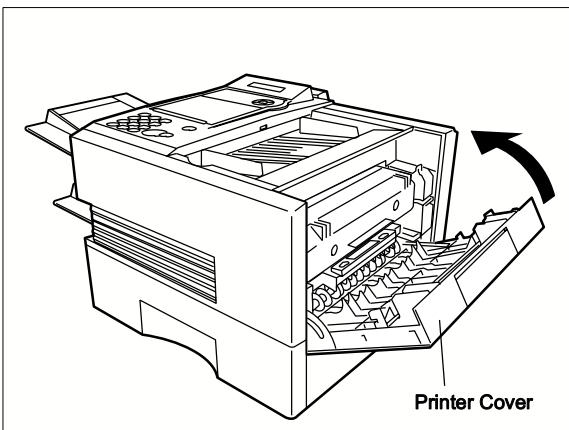
Continued on the next page...

4



Align the arrow and the projection on both sides as shown and insert the Toner Cartridge into the machine.

5



Close the Printer Cover firmly.

6

If you are replacing the Toner Cartridge, it is recommended to clean the Printer Roller to maintain good printing quality. To clean the Printer Roller, follow the procedure on the User's Guide.

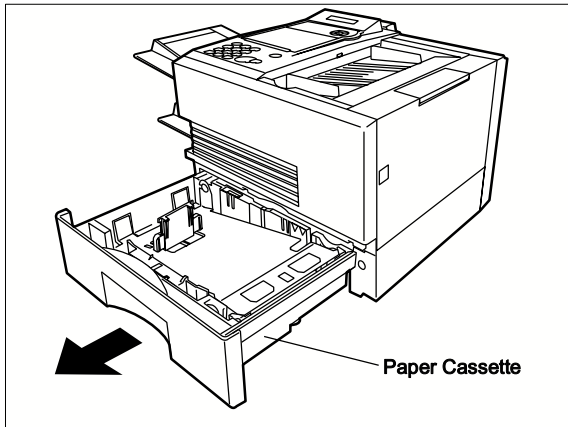
8.5. Loading the Recording Paper

Paper Specifications

In general, most bond papers will produce excellent results. Most photocopy papers will also work very well. There are many "name" and "generic" brands of paper available. We recommend that you test various papers until you obtain the results you are looking for. For detailed recommended paper specifications, see page 202 of the User's Guide.

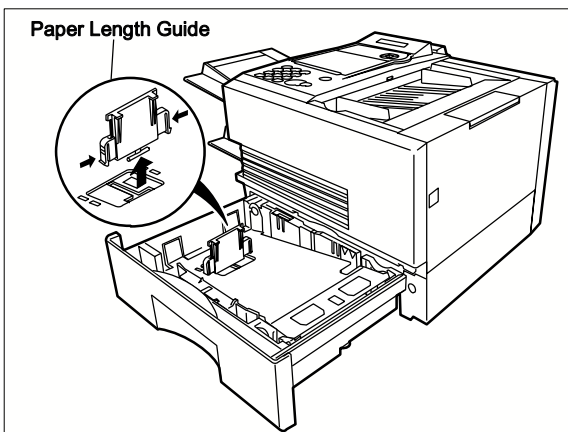
How to Load the Recording Paper

1



Slide out the Paper Cassette from the machine.

2

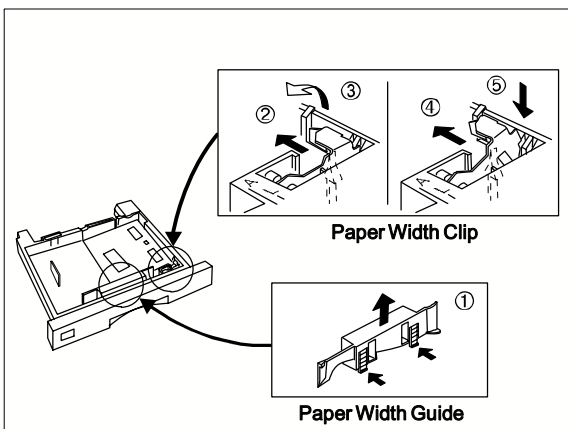


Adjust the Paper Length Guide to the proper paper size (A4, LTR, or LGL).

For LGL size paper, remove the Paper Length Guide and store it in the provided slot in the front left side of the Paper Cassette.

If reloading the same size of paper, skip the step 2 and 3.

3



Adjust the Paper Width Guide and Clip to the proper paper (A4, or LTR/LGL).

The factory default for the Paper Width Guide and Clip are on LTR/LGL or A4 position. For another paper size, adjust by following the steps below.

(1) Replace the Paper Width Guide into the proper slot (A4 or LTR/LGL).

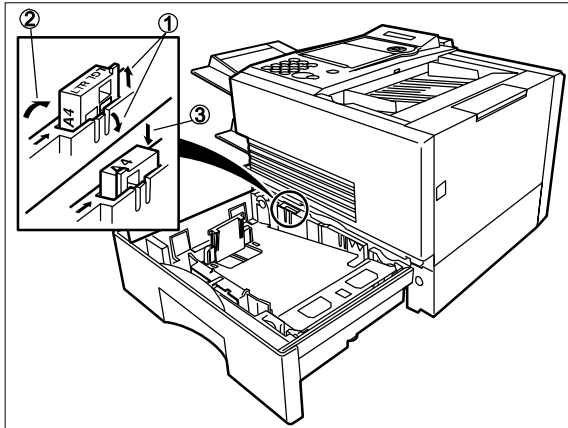
(2) Release the Paper Width Clip latch.

(3) Pull upwards to remove the Paper Width Clip.

(4) Replace the Paper Width Clip into the A(A4) or L(LTR/LGL) slot.

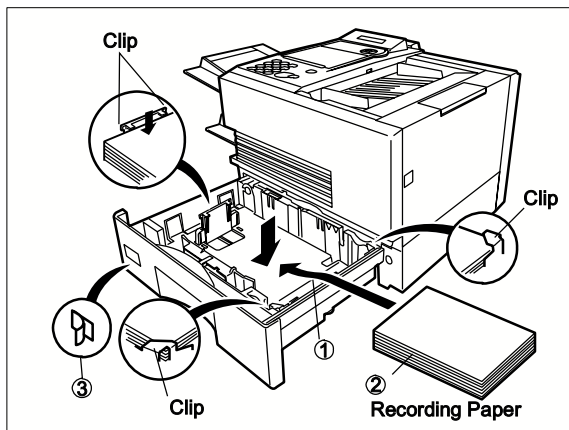
(5) Push down on the Paper Width Clip to latch it in place.

4



- (1) Release the hook and remove the Paper Size Selector.
- (2) Rotate the Paper Size Selector until the appropriate setting marked on the Selector is facing upward and the wording is upright.
- (3) Reinstall the Paper Size Selector.

5

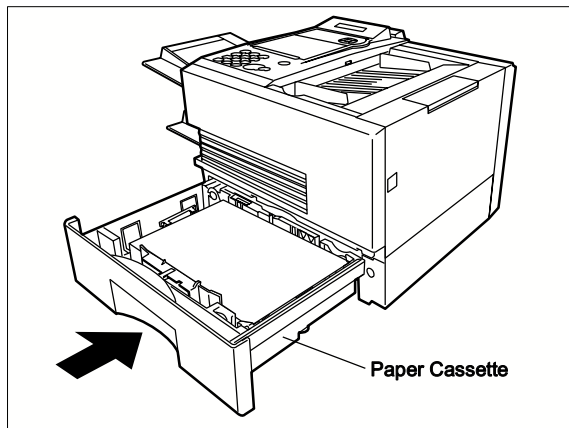


- (1) Push the Pressure Plate until it is locked down.
- (2) Load the paper into the Paper Cassette.

Caution: Make sure that the paper is set under the clips of the Paper Cassette. You can load about 500 sheets with standard weight paper (20 lb. or 75 g/m²). For paper specification see page 202 of the User's Guide.

- (3) Set the proper paper size label.

6

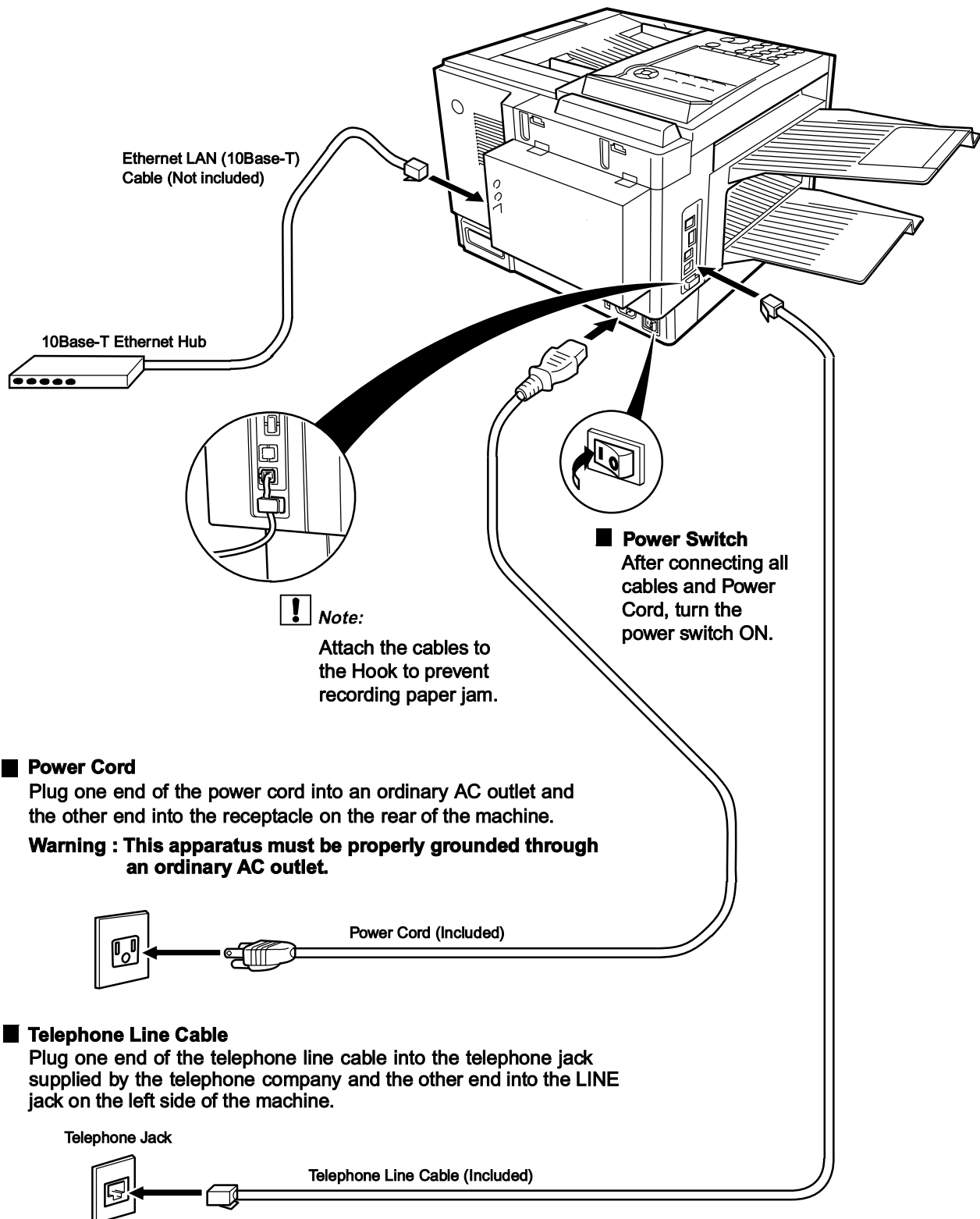


Slide the Paper Cassette into the machine.



Note: 1. Your machine will properly print on A4, Letter and Legal size paper only. If other size of paper (B4, B5, A5) is used, your machine may not print properly.

8.6. Connecting the Telephone Line Cable and Power Cord



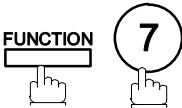
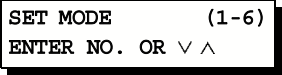
! **Note:** 1. Your machine uses little power and you should keep it ON at all times.

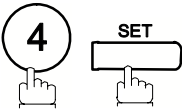

8.7. Customizing Your Machine

Your facsimile machine has a variety of adjustable Fax Parameters. These parameters, listed in the Parameter Table, are preset for you and do not need to be changed. If you do want to make a change, read the table carefully. Some parameters, such as the Resolution, Contrast, and Verification Stamp parameters, can be temporarily changed by simple key operation just before a transmission is made. When the transmission ends, however, these parameters return to their preset values (Home position). Other parameters can only be changed by the procedure described below.

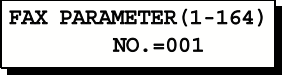
Setting the Fax Parameters



- 1**



- 2**

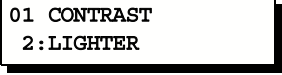


- 3** Enter Fax Parameter number from the Parameter Table (see pages 311 to 315).



Ex: ① ① ① for **CONTRAST**


- 4**



- 5** Enter the new setting value.

Ex: ② for **LIGHTER**


- 6**

To set another parameter, press **CLEAR** to return to step 3, or to return to standby, press **STOP**.

! **Note:** 1. To scroll the Fax Parameters in Step 2 or 4, press ▼ or ▲.
2. To print out a Fax Parameter List, see the User's Guide.

Fax Parameter Table

No.	Parameter	Setting Number	Setting	Comments
001	CONTRAST	1	Normal	Setting the home position of the CONTRAST key.
		2	Lighter	
		3	Darker	
002	RESOLUTION	1	Standard	Setting the home position of the RESOLUTION key.
		2	Fine	
		3	400 dpi	
004	STAMP	1	Off	Setting the home position of the STAMP key. To select the stamp function when document is stored in memory, see Fax Parameter No. 028.
		2	On	
005	MEMORY	1	Off	Setting the home position of the MEMORY key. 2 On
		2	On	
006	DIALING METHOD	1	Pulse	Selecting the dialing method.
		2	Tone	
007	HEADER PRINT	1	Inside	Selecting the printing position of the header. Inside : Inside TX copy area. Outside : Outside TX copy area. No print : Header is not printed.
		2	Outside	
		3	No print	
008	HEADER FORMAT	1	Logo, ID No.	Selecting the header format.
		2	From To	
009	RCV'D TIME PRINT	1	Invalid	Selecting whether the machine prints the received date & time, remote ID, percentage of reduction and page number on the bottom of each received page.
		2	Valid	
010	KEY/BUZZER VOLUME	1	Off	Selecting the volume of the Key/Buzzer tone.
		2	Soft	
		3	Loud	
012	COMM. JOURNAL	1	Off	Selecting the home position of printout mode for COMM. Journal Off/Always/INC. Off : Does not print. Always : Always prints. Inc. only : Prints only when communication has failed.
		2	Always	
		3	Inc. only	
013	AUTO JOURNAL PRINT	1	Invalid	Selecting whether the machine prints the journal automatically after every 100 transactions.
		2	Valid	
014	FILE ACCEPTANCE REPORT	1	Invalid	Selecting whether the machine prints the file acceptance journal. If you set this parameter to valid, a journal will print after any memory communication.
		2	Valid	
017	RECEIVE MODE	1	Manual	Setting the reception mode to automatic or manual.
		2	Auto	

Continued on the next page...

No.	Parameter	Setting Number	Setting	Comments
022	SUBSTITUTE RCV	1	Invalid	Selecting whether the machine receives to memory when recording paper runs out, toner runs out or recording paper is jammed.
		*2	Valid	
024	PRINT REDUCTION	1	Fixed	Selecting print reduction mode. Fixed: Reduce received document according to setting of Parameter No. 025.
		*2	Auto	Auto: Reduce received document according to the length of received documents.
025	REDUCTION RATIO	70	70%	Selecting fixed print reduction ratio from 70% to 100%. This parameter functions only when fixed print reduction is selected on Fax Parameter No. 024.
		—	—	
		100	100%	
026	POLLING PASSWORD		(—)	Setting a 4-digit password for secured polling. (See page 153 of the User's Guide)
028	STAMP AT MEM. XMT	1	Invalid	Selecting whether the machine stamps the original documents when storing the documents into memory. (depending on the Stamp setting on the Control Panel)
		*2	Valid	
031	INCOMPLETE FILE SAVE	*1	Invalid	Selecting whether the machine retains the document in memory if the document is not successfully transmitted.
		2	Valid	
032	COPY REDUCTION	1	Manual	Selecting whether the machine performs the copy reduction ratio automatically or manually. Manual : The machine will prompt you for the Zoom ratio (100% to 70%) when making copies.
		*2	Auto	Auto : The machine will automatically determine the reduction ratio according to the length of the original document.
033	XMT REDUCTION	1	Invalid	Selecting whether the machine performs reduction when the transmitting document is wider than the recording paper used at the receiving machine.
		*2	Valid	
034	ENERGY SAVER MODE	1	Off	To reduce the power consumption in standby, specify the Delay Time (1 to 120 minutes) for the machine to enter into the Energy-Saver mode. Off : The unit will remain in standby mode and consume more energy than when in Energy-Saver Mode.
		*2	Energy-Saver	Energy-Saver Mode : Saves energy by consuming less power than when in standby mode by turning off the fuser unit after the specified time.
035	DAYLIGHT TIME	1	Invalid	Selecting whether the clock adjusts for Daylight Saving Time automatically. The built-in clock will advance 1 hour at 2:00 am on the first Sunday in April and fallback 1 hour at 2:00 am on the last Sunday in October.
		*2	Valid	
036	RING PATTERN DETECT (DRD) (See Note 2.)	*1	Invalid	All ring patterns.
		2	Valid	Select a ring pattern for automatic answering. 1: A Standard ring pattern. 2: B Double ring pattern. 3: C Triple ring pattern (Short-Short-Long). 4: D All other triple ring pattern, except the type C described above.

No.	Parameter	Setting Number	Setting	Comments
038	ACCESS CODE		(—)	Enter a 4-digit Access Code to secure the machine from unauthorized use. (See page 146 of the User's Guide) All : Restricts access to all operations of the machine. Parameters : Restricts access to User Parameters (F-7-1), Fax Parameters (F-7-4) and Fax Parameter List Printing (F-6-4) only.
039	PIN CODE ACCESS	*1	None	Selecting the access method (Prefix or Suffix) to dial a number with PIN Code. (See page 149 of the User's Guide)
		2	Suffix	
		3	Prefix	
052	DIAGNOSTIC PASSWORD		(—)	Setting the password for Remote Diagnostic Mode. Please ask your Panasonic Authorized Dealer for details.
053	SUB-ADDRESS PASSWORD		(—)	Setting a 20-digit password for secured sub-address communication.
054	FAX FORWARD	*1	Invalid	Selecting whether the machine performs Fax Forwarding to the specified destination. (See page 138 of the User's Guide)
		2	Valid	
058	LANGUAGE	*1	A-English	Selecting the language to be shown on the display and reports. [USA User] American English or Spanish [Canadian User] American English or Canadian French
		2	C-French	
			Spanish	
060	OPTION PAGE MEMORY (D-RAM Card)	*1	0MB	Set the size of the page memory to match the optional Expansion D-RAM Card installed in the machine. (See page 203 of the User's Guide)
		2	2MB	
		3	4MB	
		4	8MB	
065	PRINT COLLATION	1	Invalid	Selecting whether the machine prints out documents in sequence. (See page 116 of the User's Guide)
		*2	Valid	
082	QUICK MEMORY XMT	1	Invalid	Selecting whether the machine performs QUICK Memory Transmission. (See page 92 to 96 of the User's Guide) Invalid : Stores all documents into memory first before dialing the telephone number. Valid : Starts dialing the telephone number immediately after storing the first page or when the storing data reaches 10KB.
		*2	Valid	
099	MEMORY SIZE (Flash Memory)	-	-	Displays the amount of base and optional memory installed. (Base Memory + Optional Memory)
140	LAN RELAY XMT REQUEST	*1	Invalid	Selecting whether the machine performs LAN Relay XMT Request.
		2	Valid	
141	LAN XMT REDUCTION	1	Invalid	Selecting whether to automatically reduce from B4 to A4, when B4 documents are transmitted via LAN. Invalid : No reduction Valid : Automatic reduction from B4 to A4
		*2	Valid	

Continued on the next page...

No.	Parameter	Setting Number	Setting	Comments
142	RELAY XMT (a.k.a. LAN RELAY STATION on UF-770i)	1	Invalid	Selecting whether the machine accepts and performs G3 relayed transmission. (Relay Station Functions)
		*2	Valid	
143	RELAY XMT REPORT	1	Off	Setting how the COMM. Journal for relayed transmission is sent to the originator. Off : Don't send. Always : Always send. Inc.only : Send only if communication has failed.
		*2	Always	
		3	Inc. only	
144	EMAIL CHARACTER SET	1	Japanese	Selecting the Character Set when receiving or sending email text.
		*2	English	
145	SENDER SELECTION	*1	Invalid	Selectinga pre-programmed sender's name and email address before each transmission. (See page 125 of the User's Guide)
		2	Valid	
146	POP TIMER	—	0 to 60 min.	Setting the time interval for the machine to check for email on the POP Server. (0 = Does not check the POP Server for email.)
		3	*3 min.	
147	AUTO POP RCV (See Note 3.)	1	Invalid	Selecting whether the machine automatically downloads an email from the POP Server.
		*2	Valid	
148	DELETE POP RCV EMAIL	1	Invalid	Selecting whether the email will be deleted automatically after retrieval from the POP Server.
		*2	Valid	
149	DELETE POP ERR EMAIL	*1	Invalid	Selecting whether to delete the email that includes an incompatible file attachment from the POP Server.
		2	Valid	
150	IFAX RETURN RECEIPT	1	Invalid	Selecting whether to send a return receipt when receiving from another Panafax Internet Fax.
		*2	Valid	
151	EMAIL HEADER FORMAT	1	All	Selecting the header information to print when an email is received. (Normally used for Troubleshooting. It shows the path of the email transmission before arriving at the DX-2000.)
		*2	Subject/From/To	
		3	Off	
152	SUB-ADDRESS ROUTING	*1	Invalid	Selecting whether to automatically route a received fax or email using ITU-T sub-address.
		2	Valid	
153	TSI ROUTING	*1	Invalid	Selecting whether to route a received fax to a telephone number or an email address preprogrammed in One-Touch, ABBR No. or Program Key using the originating fax's Numeric ID (TSI frame information).
		2	Valid	
154	ROUTING HEADER FORMAT	*1	Originator	Selecting the type of email header to be included in the "From" field of each routed faxes. Originator : The originating fax machine's TSI will appear in the "From" field of the routed email. Relay Station : The routing station's email address will appear in the "From" field of the routed email.
		2	Relay Station	
155	PRINT ROUTED DOCUMENT	*1	Inc. only	Selecting whether a received fax to be routed is always printed or only when the routing operation fails.
		2	Always	

No.	Parameter	Setting Number	Setting	Comments
156	PRINT FORWARDED DOCUMENT	*1	Invalid	Selecting whether a memory received fax or email to be forwarded is always printed or only when forwarding is incomplete.
		2	Valid	
157	TRANSACTION JOURNAL	*1	Invalid	Selecting whether the machine sends a transaction journal to the pre-programmed email address.
		2	Valid	
158	PC REMOTE UPDATE	*1	Invalid	Selecting whether the machine will accept commands from an email application, to: (See page 46 to 62 of the User's Guide) (a) Program the Internet Parameters (b) Program the Auto Dialer (c) Allow retrieval of the Journal
		2	Valid	
159	SUBJECT LINE ENTRY	*1	Invalid	Selecting whether the "Subject" line can be programmed during each transmission.
		2	Valid	
160	DEFAULT DOMAIN	1	Invalid	Selecting whether the machine accepts to insert the Default Domain (See page 41 of the User's Guide) when entering Manual Number Dialing.
		*2	Valid	
161	DNS SERVER	1	Invalid	Selecting whether to use the DNS Server for the Internet communication.
		*2	Valid	
162	TIFF VIEWER URL	1	None	Selecting whether to include the URL address in the email message body.
		*2	English	
		3	English +Japanese	
163	ROUTING HEADER	*1	Invalid	Selecting whether to add the Header Print information of the Routing Station on the top edge of each routed pages.
		2	Valid	
164	IFAX XMT HEADER (Email only)	*1	Included	Selecting whether to include the header when sending a document to an addressee in the same Domain as specified in the Default Domain parameter. (This is useful when using the machine to scan documents back to your PC)
		2	Not included	<i>Note:</i> When sending to a Domain other than as specified in the Default Domain parameter, the header will be included regardless of the selection.




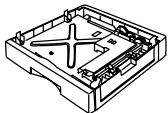
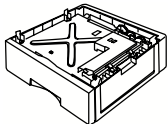


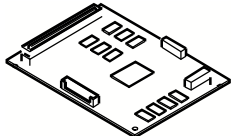
- Note:** 1. The standard settings are printed on the Fax Parameter List. To print out Fax Parameter List, see page 180.
2. The contents of Fax Parameter may differ depending on the each country / *******
3. When this parameter (No. 147) is set to "Valid" (default), POP is selected as your email retrieval protocol. The G3 Fax Gateway function in this case is disabled since it requires SMTP.

9 Options and Supplies

9.1 Options and Supplies

Please contact your local Panasonic dealer for availability.


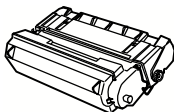
A. Options:

Order No.	Picture	Description
UE-403160		Handset Kit
UE-409057		250 sheets Letter / Legal / A4 Size Paper Cassette with the Feeder Unit
UE-409056		500 sheets Letter / Legal / A4 Size Paper Cassette with the Feeder Unit
UE-410045		Expansion Flash Memory Card, 1 MB
UE-410046		Expansion Flash Memory Card, 2 MB
UE-410047		Expansion Flash Memory Card, 4 MB
UE-410048		Expansion Flash Memory Card, 8 MB
UE-410033		Expansion D-RAM Card, 2MB
UE-410034		Expansion D-RAM Card, 4MB
UE-410057		Expansion D-RAM Card, 8MB
UE-403169		Page Description Language Printer Emulation Kit (Available in the beginning of Year 2000)



Note: 1. Flash Memory Card is used for document storage.
2. D-RAM Memory Card is used to enhance the machine's overall performance and printing resolution.

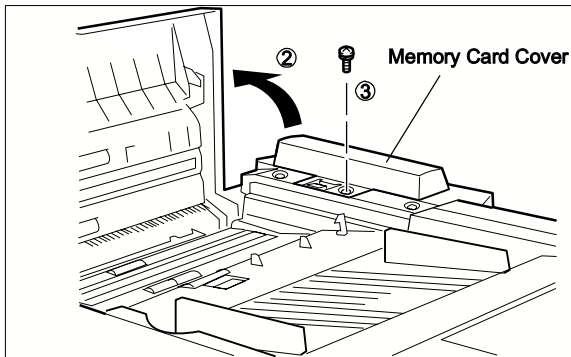
B. Supplies:

Order No.	Picture	Description
DZHT000004		Verification Stamp
UG-3313		Toner Cartridge

9.2. Installing the Memory Card (Flash Memory Card and / or D-RAM Card)

Before installing, make sure that there is no document file(s) stored in the memory. You may confirm by printing out a File List (see page 139 of the User's Guide). When the memory card is installed, the machine will initialize the document memory, all contents stored in the document memory at that time will be lost.

1



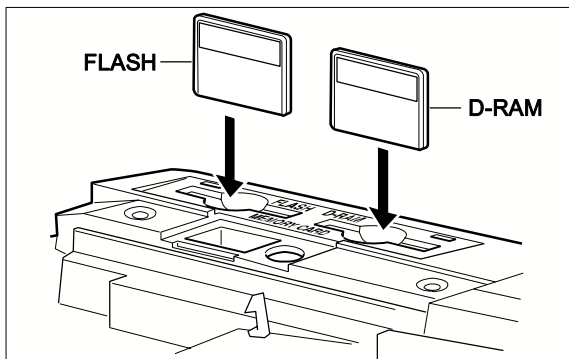
(1) Turn the Power Switch to the "O" (OFF) position located in the rear of the machine.

(2) Open the ADF Door.

(3) Remove a Screw.

(4) Remove the Memory Card Cover.

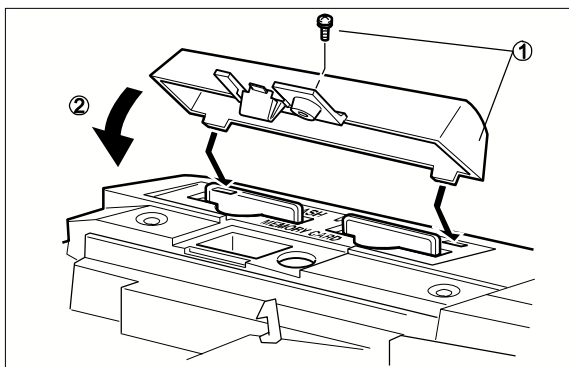
2



Insert the Memory Card(s) gently into the card slot with the Panasonic logo facing to the rear.

Caution: Installing the Memory Card(s) in the wrong direction may damage the connecting pins inside the machine.

3



(1) Re-install the Memory Card Cover and the Screw to secure the Cover.

(2) Close the ADF Door.

4

Turn the Power Switch to the "I" (ON) position. Print out the Fax Parameter List (see page 180 of the User's Guide) and confirm that the memory size on Fax Parameter No. 099. (See page 74 of the User's Guide and the Note 2 below.)



Note: 1. The document(s) stored in memory will be lost if the memory card is removed.
2. The memory size on Fax Parameter No. 099 is only shown for the Flash Memory Card.

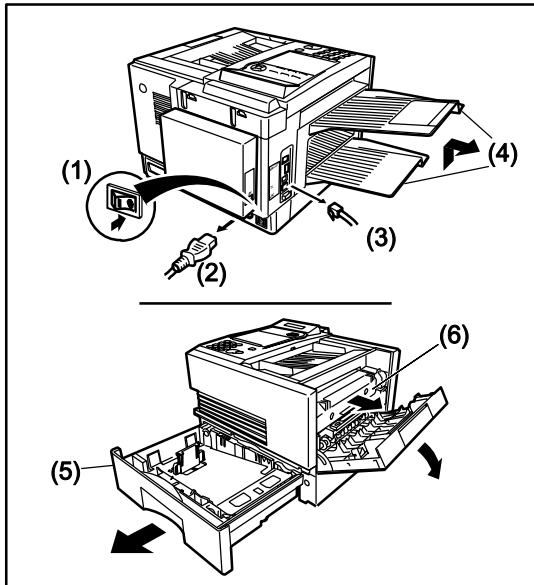
9.3. Installing Optional Feeder Unit (UE-409057)

1. Contents

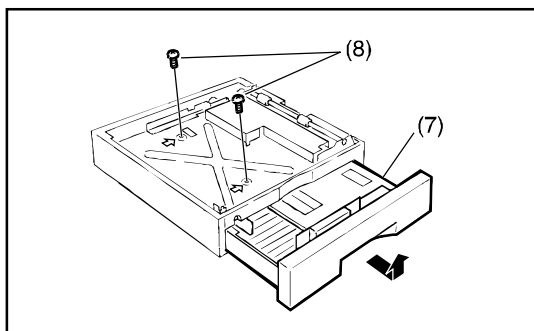
Qty.	Description	Part No.	Remarks
1	250 Sheets Paper Cassette with Feeder Unit	-	
1	Paper Size Label Set	DZNK000298	

2. Installation

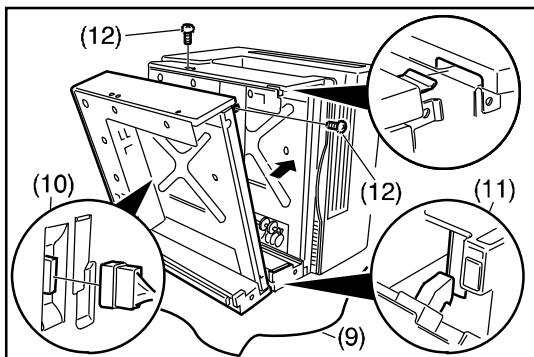
Note: Install this Feeder Unit as the 2nd Feeder Unit only.



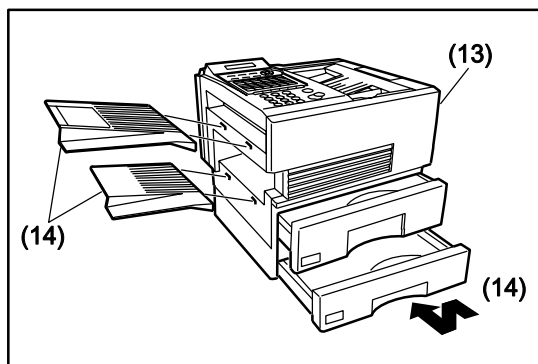
- (1) Turn the Power Switch to the OFF (O) position.
- (2) Disconnect the Power Cord.
- (3) Disconnect the Telephone Line Cable.
- (4) Remove the Document Trays.
- (5) Remove the Paper Cassette from the machine.
- (6) Remove the Toner Cartridge from the machine.



- (7) Remove the Paper Cassette from the Optional Feeder Unit.
- (8) Remove the two Screws on the new Feeder Unit indicated by the arrow marks. (These screws are used to attach the Feeder Unit to the machine in step 12.)



- (9) Place the machine on its right side on top of a clean cloth to prevent damaging the Printer Cover.
- (10) Plug-in the connector of the Feeder Unit.
- (11) Hook the latches of the Feeder Unit into the holes and set the Feeder Unit in the direction of the arrow.
- (12) Secure the Feeder Unit with the screws removed in step 8.



(13) Place the machine upright.

(14) Re-install the Document Trays, the Paper Cassettes and the Toner Cartridge.

(15) Re-connect the Power Cord and the Telephone Line Cable.

(16) Turn the Power Switch to the ON (I) position.

(17) Print some pages from the Optional Feeder Unit to confirm its operation.

Note: The paper size guides are factory set to the Letter size. If you are using either A4 or Legal size paper, please adjust the paper size guides accordingly.

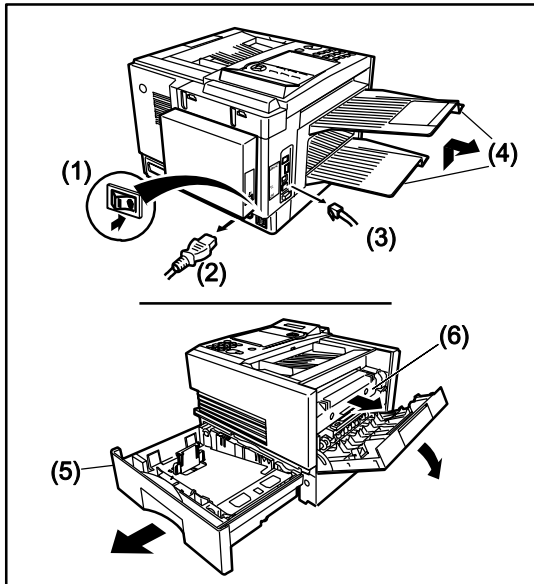
9.4 Installing Optional Feeder Unit (UE-409056)

1. Contents

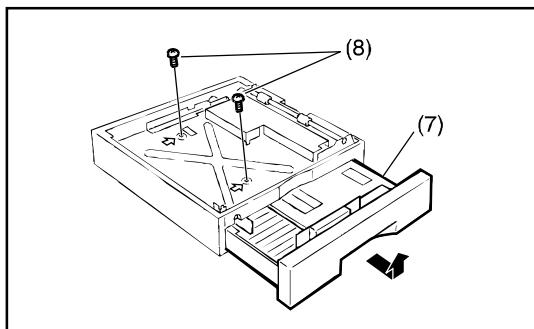
Qty.	Description	Part No.	Remarks
1	500 Sheets Paper Cassette with Feeder Unit	-	
1	Paper Size Label Set	DZNK000298	

2. Installation

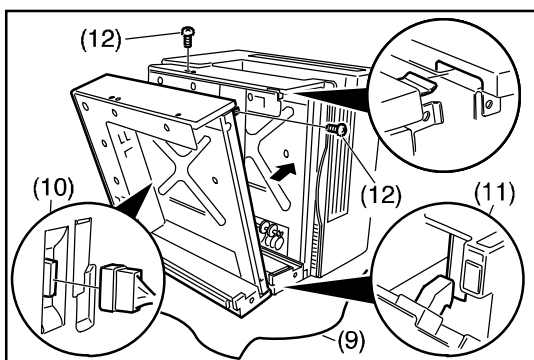
Note: Always install this Feeder Unit at the base of the unit. Install it as the 2nd Feeder Unit when configured for two cassettes or as the 3rd Feeder Unit when configured for three cassettes.



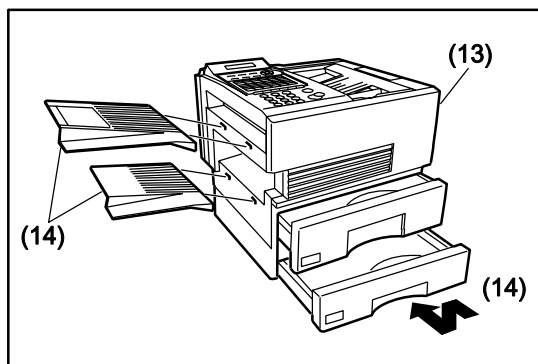
- (1) Turn the Power Switch to the OFF (O) position.
- (2) Disconnect the Power Cord.
- (3) Disconnect the Telephone Line Cable.
- (4) Remove the Document Trays
- (5) Remove the Paper Cassette from the machine.
- (6) Remove the Toner Cartridge from the machine.



- (7) Remove the Paper Cassette from the Optional Feeder Unit.
- (8) Remove the two Screws on the new Feeder Unit indicated by the arrow marks. (These screws are used to attach the Feeder Unit to the machine in step 12.)



- (9) Place the machine on its right side on top of a clean cloth to prevent damaging the Printer Cover.
- (10) Plug-in the connector of the Feeder Unit.
- (11) Hook the latches of the Feeder Unit into the holes and set the Feeder Unit in the direction of the arrow.
- (12) Secure the Feeder Unit with the screws removed in step 8.



(13) Place the machine upright.

(14) Re-install the Document Trays, the Paper Cassettes and the Toner Cartridge.

(15) Re-connect the Power Cord and the Telephone Line Cable.

(16) Turn the Power Switch to the ON (I) position.

(17) Print some pages from the Optional Feeder Unit to confirm its operation.

Note: The paper size guides are factory set to the Letter size. If you are using either A4 or Legal size paper, please adjust the paper size guides accordingly.

9.5 Installing Page Description Language Printer Emulation Kit (UE-403169)

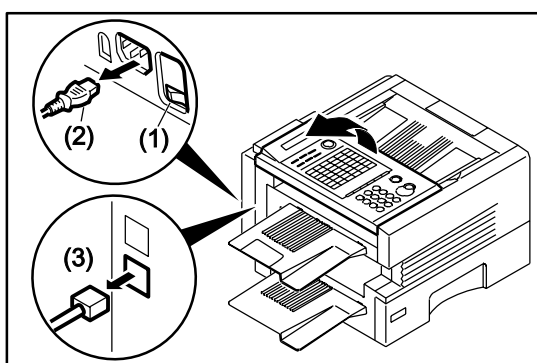
1. Contents

No.	Part No.	Description	Qty.	Remarks
1.	DZEC101411	Enhanced Printing PC Board w/ FRM PC Board	1	-
2.	DZJH000059	PCB Spacer	1	-
3.	DZQW000179	Printer Driver Disks	1	6 disks, 3½" 2HD Floppy
4.	DZSD001051	User's Guide	1	
5.	DZSH000080	License Agreement	1	
6.	DZSM000247	Installation Guide	1	This document

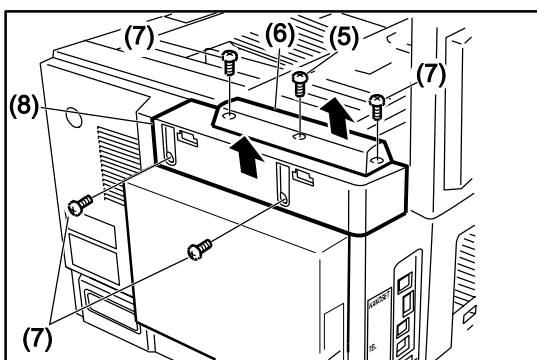
2. Installation

Before proceeding with the installation, verify that your machine has the appropriate Optional Firmware (V2.0000 or later) by checking the Function Parameter No. 60. If not, refer to page 52 of the Service Manual on how to create a Master Firmware Card.

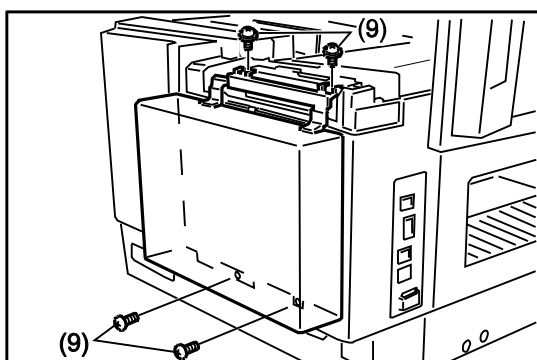
Note: The Master Firmware Card is Not included with this kit.



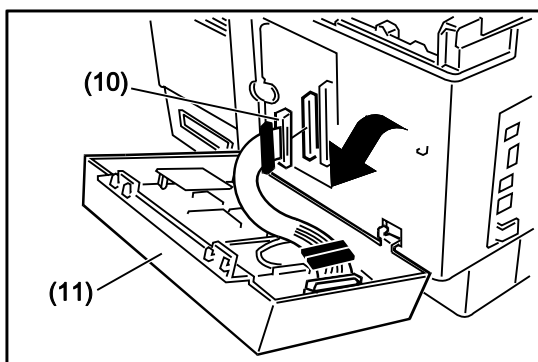
- (1) Turn the Power Switch to the OFF (O) position.
- (2) Disconnect the Power Cord.
- (3) Disconnect the Telephone Line Cable and Ethernet LAN Cable.



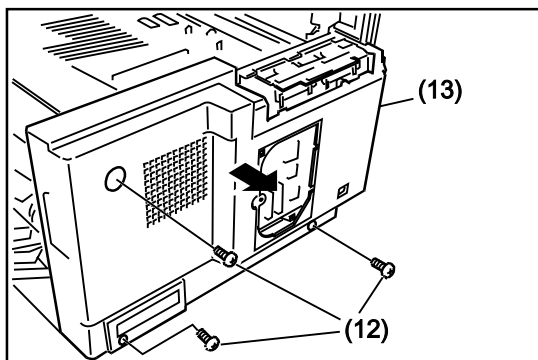
- (4) Open the Control Panel.
- (5) Remove 1 Screw.
- (6) Remove the Memory Card Cover.
- (7) Remove 4 Screws.
- (8) Remove the Sub Rear Cover.



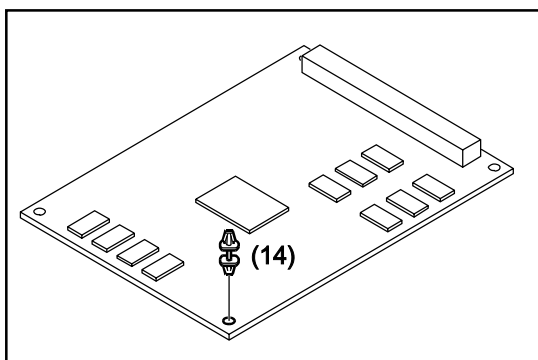
- (9) Remove 4 Screws.



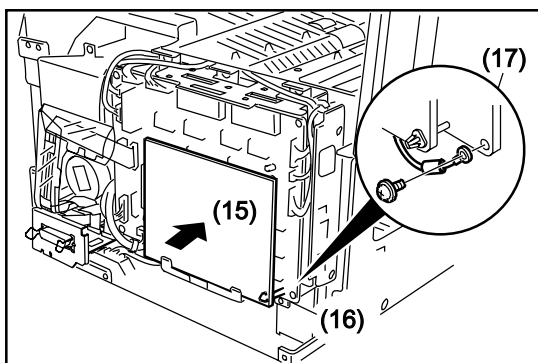
- (10) Disconnect the Ribbon Cable from CN50 on the FCB PC Board in the machine.
- (11) Remove the Internet Module.



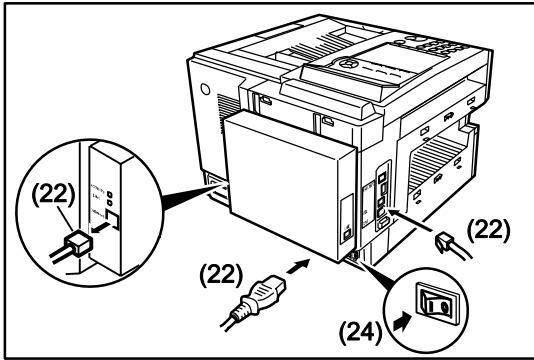
- (12) Remove 3 Screws.
- (13) Remove the Rear Cover.



- (14) Insert the PCB Spacer into the hole on the PDL PC Board.



- (15) Connect the PDL PC Board to the CN55 on the FCB PC Board.
- (16) Secure the PDL PC Board by inserting the PCB Spacer into the hole on the FCB PC Board.
- (17) Remove 1 Screw on the FCB PC Board and connect the GND Cable with the screw.



- (18) Re-install the Rear Cover.
- (19) Connect the Ribbon Cable to the CN50 on the FCB PC Board in the machine.
- (20) Re-install the Internet Module.
- (21) Re-install the Sub Rear Cover.
- (22) Re-connect the Power Cord, the Telephone Line Cable and the Ethernet LAN Cable.
- (23) Insert the Master Firmware Card that you have prepared into the machine.
- (24) Turn the Power Switch to the ON (I) position.
- (25) Perform the Service Mode 9-1 (Firmware Update).
(see page 229)
- (26) Perform the Service Mode 6 (Parameter Initialization).
- (27) Turn the Power Switch to the OFF (O) position.
- (28) Remove the Master Firmware Card.
- (29) Re-install the remaining Trays.
- (30) Turn the Power Switch to the ON (I) position.

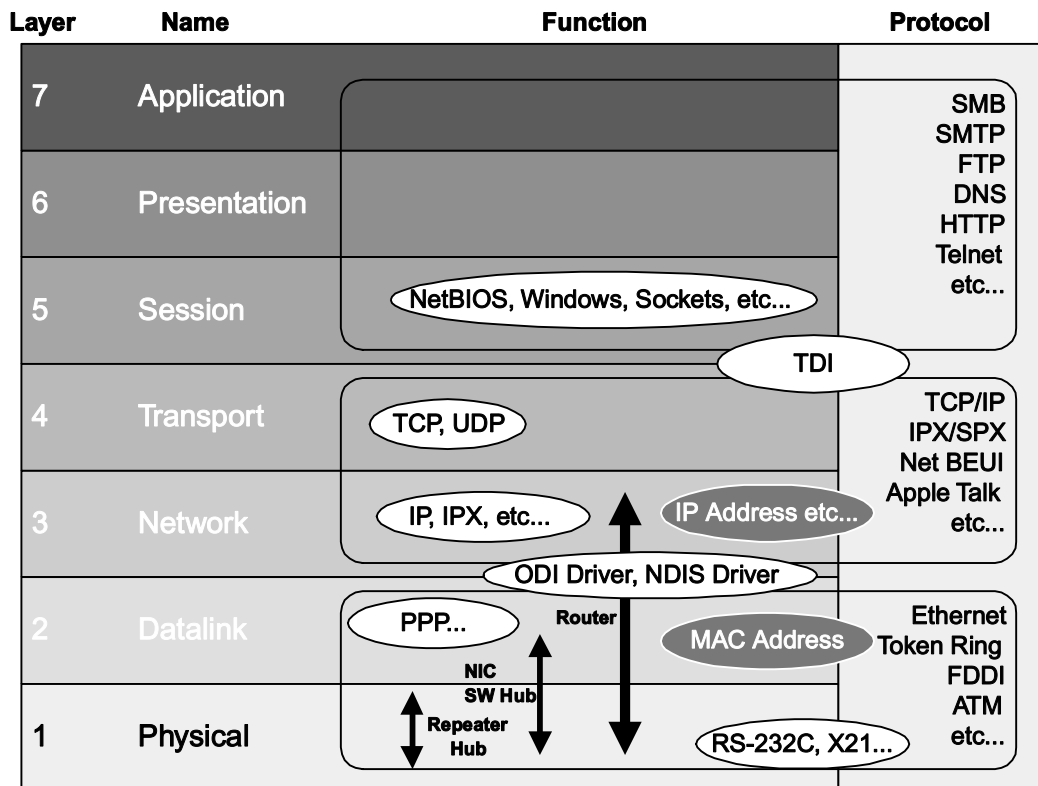
10 General Network Information

10.1 Network Protocol

10.1.1 OSI Reference Mode

Having a model in mind helps you understand how the pieces of the network puzzle fit together. The most commonly used model is the Open System Interconnection (OSI) reference model. The OSI model, first released in 1984 by the International Standards Organization (ISO), provides a useful structure for defining and describing the various processes underlying networking communications.

The OSI model organizes communication protocols into seven layers. Layer 1, the Physical (Hardware) layer, consists of protocols that deal with how data is transferred accross the transmission media. At the opposite end, Layer 7, the Application layer, interfaces the network services with the applications (software) in use on the computer. The five layers in between, Data Link, Network, Transport, Session and Presentation - perform intermediate communication tasks. In essence the OSI model is a framework that describes how a function from one computer is transmitted to another computer on the network.



OSI Reference Model and Network Terms

10.1.2 Protocol

One reason for the popularity of TCP/IP is that no one vendor owns it, unlike the IPX/SPX, DNA, SNA or Apple Talk protocol suites, all of which are controlled by specific companies. TCP/IP evolved in response to input from a wide variety of industry sources. Consequently, it is the most open of the protocol suites and is supported by the widest variety of vendors. One huge advantage of using TCP/IP is that, it is required for communication over the Internet, thus the Internet can be used as a communication backbone.

TCP/IP was originally designed by ARPANET (Advanced Research Project Agency) in 1969 for the UNIX operating system. In early 1980, UNIX 4.2 BSD version was released. For more detailed information, an RFC (Request for Comment) document is available from the IETF (Internet Engineering Task Force) on the Internet at <http://www.ietf.org/>.

The Internet protocols do not map cleanly to the OSI reference model. The model for the Internet protocol suite has four layers. From the illustration below, you can see the approximate relationship of the layers.

Layer	OSI Reference Model	TCP/IP Base	Function
7	Application	Application	This layer embraces functions of the OSI Session, Presentation and Application layers. Protocols at this layer provide network services.
6	Presentation		
5	Session		
4	Transport	Transport	Compares to OSI Transport layer. Enables peer communication between hosts on the internetwork.
3	Network	Internet	Corresponds roughly to the OSI Network layer. Protocols move data between devices on networks.
2	Data Link	Network Interface	Corresponds to the bottom two layers of the OSI model. This correspondence enables the TCP/IP protocols to coexist with existing Data Link and Physical layer standards. This layer is concerned with all aspects of transmitting and receiving data on the network.
1	Physical		

Comparison of the TCP/IP layers to the OSI model

10.1.3 Cable

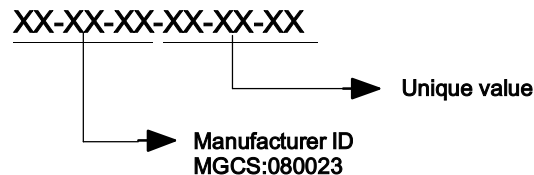
For the network transmission media at the Physical layer on the OSI reference model, there are several cable categories available. Category 5, 8 wire Unshielded Twisted Pair (UTP) cable is commonly used. Shielded Twisted Pair cables are also available. The Impedance for the STP / UTP Ethernet cable is 100 Ω . Category 3 is also used for the 10Base-T Ethernet.

Category	Purpose
1	Voice grade telephone line
2	ISDN
3	10Base-T Token Ring (4M)
4	Token Ring (16M)
5	100Base-TX, ATM (155M)

10.2 Layer Functions and Technology

10.2.1 MAC (Media Access Control)

The MAC address is burnt into each network card for establishing addresses for nodes on the network. These addresses are hexadecimal in nature and are unique for each card. The First three bytes from the left end identify the manufacturer's code that must be approved by IEEE (Institute of Electrical and Electronics Engineers). The Remaining three bytes on the right half should be kept in a unique manner. For Ethernet connections, multiple stations share the topology, therefore, the identification packet from each station should be unique.



10.2.2 Network Control

CSMA/CD (Carrier Sense Multiple Access with Collision Detection)

If a node is trying to make a link to the network, transmission from another station is prohibited and halted until the data transfer is completed and the link is off. CSMA/CD and Token Passing are typical techniques used to control the connection. The General sequence is as follows:

Wait for the next available timing to send,
Send out a frame,
Perform collision sensing simultaneously,
Retry to send the same frame up to 16 times if necessary.
(Sequence goes by a binary exponential back-off algorithm to avoid periodical incident)

802.3 (Ethernet) frame format

← Most significant bit			Least significant bit →		
Pre-amble 8 byte	Destination MAC address 6 byte	Source MAC address 6 byte	Data type 2 byte	Data 46 ~ 1500 byte	FCS 4 byte

Destination MAC address: 6 byte (uni-cast or broadcast)

If all "1" on 6 byte (FF-FF-FF-FF-FF-FF) means broadcast frame, it is detected by an applicable node, it must be passed to the upper layer.

Also, if the destination MAC address is not matched with that node, the frame is discarded at that node immediately.

Token Passing

Token passing utilizes a frame called a token, which circulates around the network. A computer that needs to transmit must wait until it receives the token, at which time the computer is permitted to transmit. When the computer is done transmitting, it passes the token frame to the next station on the network.

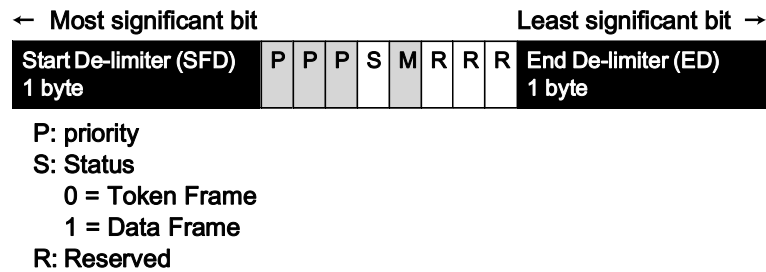
The first station that is powered up on a token-ring network automatically becomes the active monitor station. Its responsibility is to announce itself to the next active downstream station as the active monitor station and request that station to announce itself to its next active downstream station. After each station announces itself to its next active downstream neighbor, the announcing station becomes the nearest active upstream neighbor (NAUN) to the downstream station. After each station becomes aware of its NAUN, the beaconing process continues every seven seconds.

A computer in the ring captures the token, if it has data to transmit, it holds the token and transmits a data frame. This data frame is passed to each computer in the ring, which checks whether it is the intended recipient of the frame. When the frame reaches the destination address, the destination PC copies the frame to a receive buffer, updates the frame status field of the data frame and puts the frame back on the ring. When the computer that originally sent the frame receives it back from the ring, it acknowledges a successful transmission, takes the frame off the ring, and places the token back on the ring.

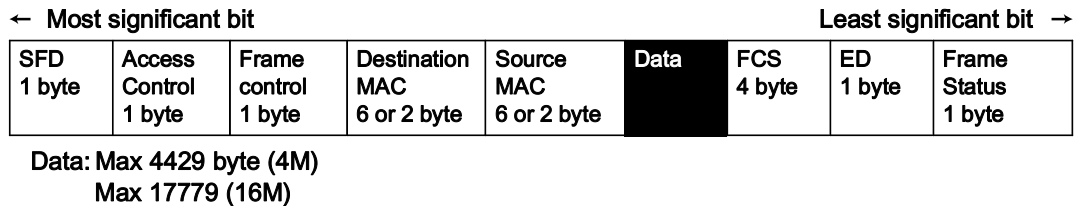
Token Frame indicates that the network is available for transmission.

Data Frame indicates that the network is busy processing a transmission.

Token Frame format



Data Frame format



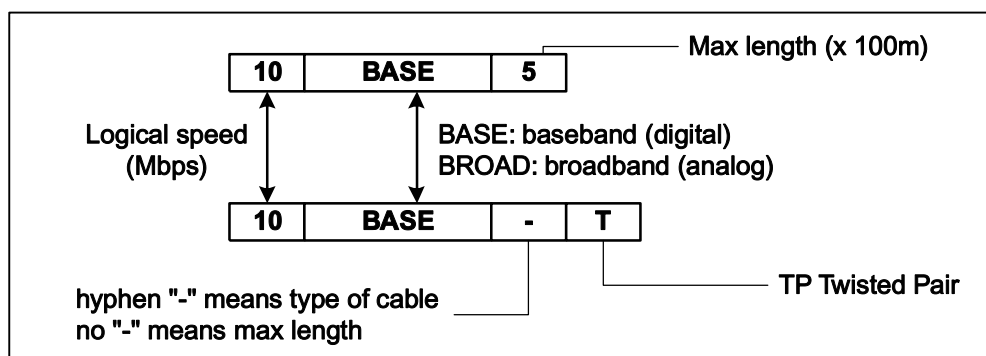
There are several different bit types assigned for Frame Status. For example, 1 and 5 bit indicates that the token has been read, 2 and 6 bit indicates that the frame has been copied by another station. Thus, we can confirm whether the Data Frame was delivered.

10.2.3 Ethernet

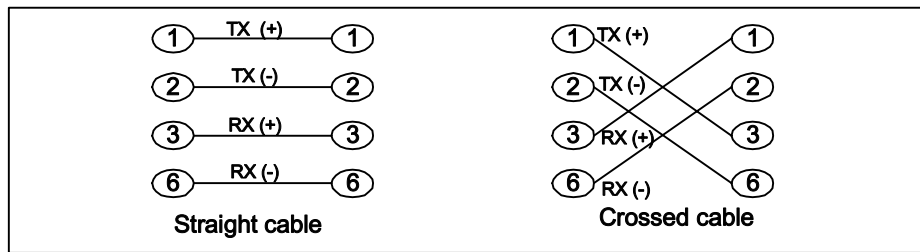
Ethernet is a very popular local area network architecture based on the CSMA/CD access method. The original ethernet specification was the basis for the IEEE 802.3 specifications. Typically, ethernet networks can use a bus physical topology, although, many varieties of ethernet such as 10Base-T uses a star physical topology and a bus logical topology. (Microsoft uses the term "star bus topology" to describe 10Base-T)

	Speed (bps)	Topology	Cable type	Max length
10Base-5	10M	Bus	Yellow cable	500 m (1640 ft)
10Base-T	10M	Star	Twisted Pair (Cat. 3, 4, 5)	100 m (328 ft)
100Base-TX	100M	Star	Twisted Pair (Cat. 5)	200 m (656 ft)

802.3 (CSMA/CD) Network Type

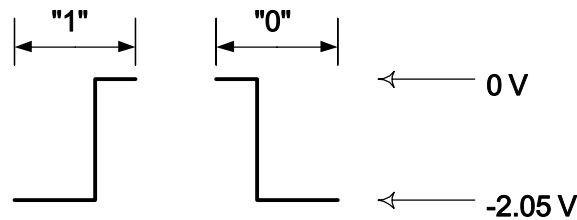


Ethernet Configuration



Ethernet Cable Pin Configuration

All eight pins on the Ethernet cable are normally wired in this configuration accordingly. The Electrical level follows the Manchester code configuration.



Out of balance in electrical levels indicates that a collision is occurring in a certain area. To avoid from further malfunctions, terminating the physical end is required for coaxial cables.

If a collision is detected, transmission is stopped and a maximum of 4.8 usec of JAM packet is sent. The node that receives the JAM packet, discards the applicable received data. The maximum timing for collision detection is called slot time, normally set to 49.9 usec. The interval of 9.6 usec to 10 usec after the end of transmission frame is reserved for non-transmission period.

There are several merits to Ethernet wiring, the physical connection is easy and flexible for future expansion due to the star topology.

10.2.4 Repeater

The main purpose of a repeater is to extend the maximum range for the network cabling. They operate at the OSI Physical layer, and do not filter or interpret the signal - they merely repeat (regenerate) the signal, passing all network traffic in all directions. They perform signal amplitude, delete errors and reschedule the timing. Repeaters also follow the 5-4-3 rule, where no more than 5 network segments connected by 4 repeaters, with no more than 3 of the segments being populated.

Active Hubs function in part as repeaters (amplify and regenerate network signals), they occasionally are called multiport repeaters.

10.2.5 NIC (Network Interface Card)

NIC is an acronym for Network Interface Card, which plugs into a computer and adapts the network interface to the appropriate standard. ISA, PCI, and PCMCIA cards are all examples of NICs.

10.3 Network Layer

10.3.1 IP Address

An IP address is a set of four numbers, or octets, that can range in value between 0 and 255. Each octet is separated by a period (i.e. 192.168.31.1). All devices on a network that runs the TCP/IP protocol suite need a unique IP address. Most machines use a Domain Name, which are easier for people to remember.

The IP addresses are actually broken down into three distinct classes, known as class A, class B and class C addresses.

Class A IP addresses contain a number between 1 and 127 before the first dot. In class A address, this first octet represents the network address, and the last three octets represent the node or host number.

Class B IP addresses can range in value from 128 to 191 for the first octet, but it is the first two octets that make up the network address, and the last two octets that make up the host ID.


Class C IP addresses can range in value from 192 to 223 for the first octet, and the first three octets make up the host ID.

There are class D and E addresses as well. For these addresses, the first octet is a number greater than 223. These addresses are not currently available to be used and are reserved for other purposes.

Class A : First octet reserved for the network address

Class B : First two octets reserved for the network address

Class C : First three octets reserved for the network address

Class A 0 

Class B 1 0 

Class C 1 1 0 

Network address represented as 

Private networks that do not connect to the Internet (operate internally) allow additional flexibility with IP addresses. Three classifications are available as shown below:

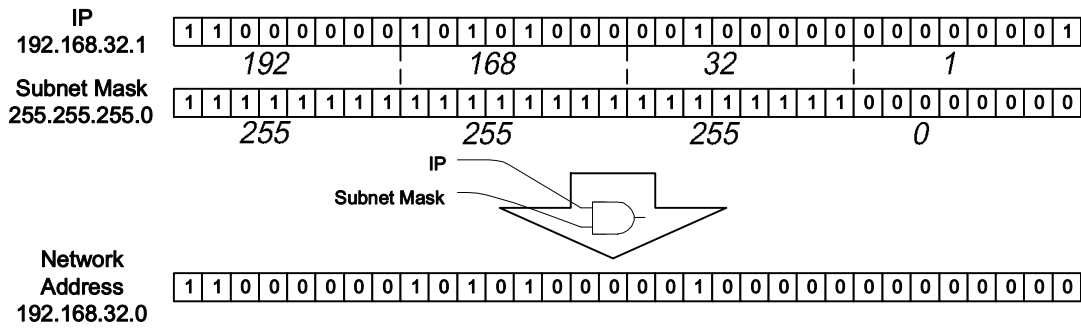
Class A : 10.0.0.0 - 10.255.255.255

Class B : 172.16.0.0 - 172.31.255.255

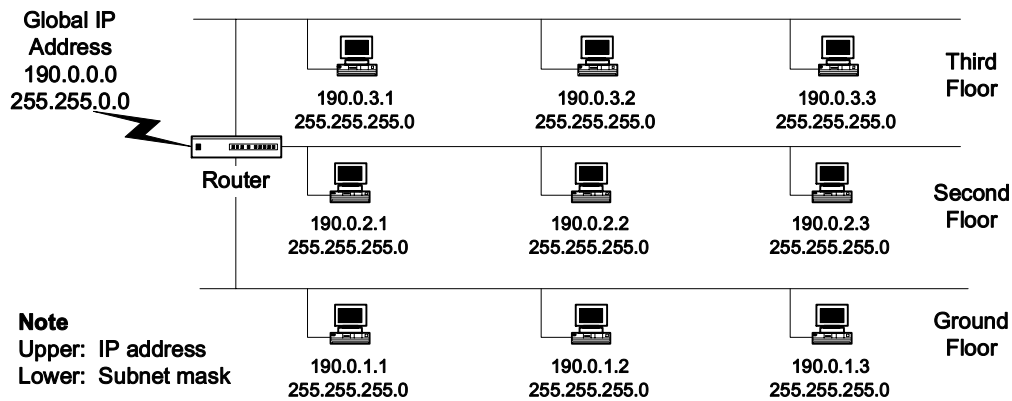
Class C : 192.168.0.0 - 192.168.255.255

10.3.2 Subnet Mask

A subnet mask defines how sub-segments of a network are treated.



Network Address Configuration



Class B Subnet Outline

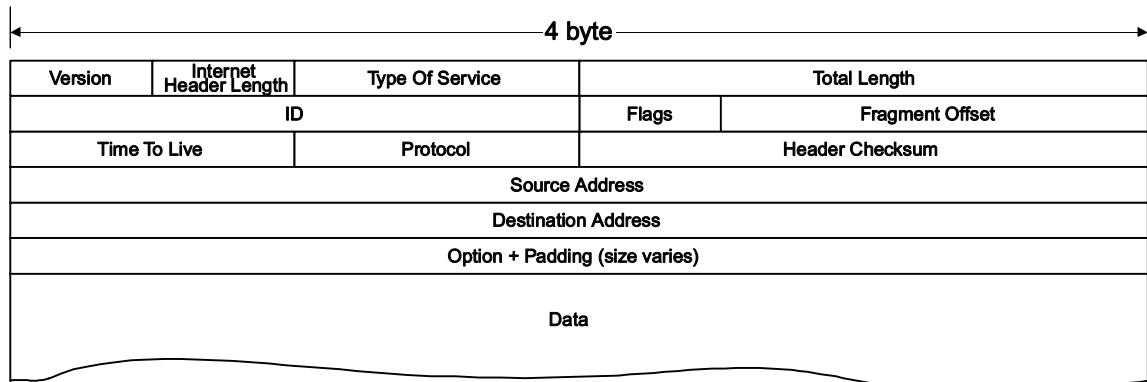
For network management purposes, special IP addresses are assigned.

1. Host address is set to all "0"
2. Host address is set to all "1"
Reserved for IP broadcasting to all subnet stations.
3. All 4 octets are set to all "1"
IP broadcast of 255.255.255.255 can be passed over the router when the network address is specified. Normally, this is used for DHCP (Dynamic Host Configuration Protocol) network.
4. All 4 octets are set to all "0"
Reserved for default route for non-destination address
5. Most significant bit starting with "127"
Reserved for loop back address

10.3.3. Internet Protocol

The IP (Internet Protocol) operating at the OSI Network layer, is a connectionless protocol that provides datagram service, and IP packets are most commonly referred to as IP datagrams. It performs the following typical functions:

1. Identifies the IP address
2. Packet disassembly and reassembly of the IP datagram
3. Routing of the IP address



IP Datagram

Terms	Detail
Version	Currently version 4
Internet Header Length	IP Header field length
Type Of Service	Service priority requested by IP Datagram (3 bits are reserved for precedence)
ID	Identification frame number for upper layer communication
Flags	Packet disassembly information
Fragment Offset	Offset from most significant bit
Time To Live	Decrement the counter until ½0½ every time packet pass over the router
Protocol	Upper layer protocol identification number. ie TCP (06h), UDP (11h)
Header Checksum	Checksum is used for error checking on the header data
Source Address	Sender's IP Address
Destination Address	Destination's IP Address
Option	When implemented
Padding	Fill bit field to add up to 32 bit

10.3.4. Router

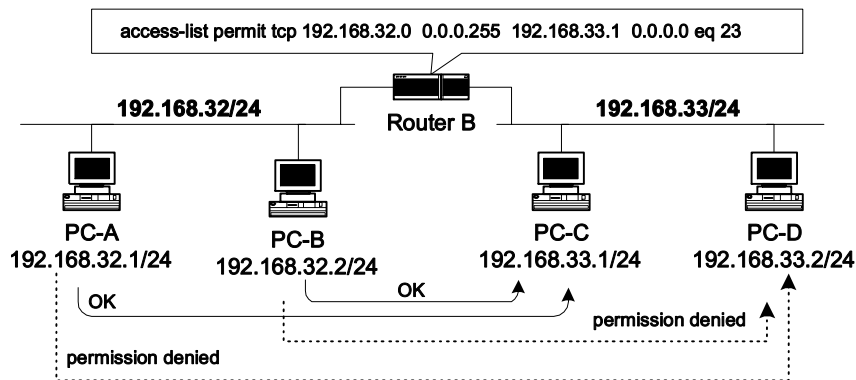
Routers, operating at the OSI Network layer, organize the large network in terms of logical network segments. Each network segment is assigned an address so that every packet has both a destination network address and a destination device address. Routers are more intelligent than bridges. Not only do routers build tables of network locations, but they also use algorithms to determine the most efficient path for sending a packet to any given network by identifying its header information. These are the typical functions:

1. Routing

This controls the traffic according to a specified routing table.

2. Packet Filtering

This performs the access and security control for specified routing.



Packet Filtering Sample

3. Address conversion

NAT (Network Address Translator), This performs conversion of a single global IP Address from/to single private IP Address.

4. IP Masquerade:

This performs a conversion of single global IP Address from/to multiple private IP Address.

At the same time the port number is automatically assigned.

Occasionally, the conversion creates a bottleneck in the network overhead. For a typical solution, PIX (Private address Internet address exchange) is available from Cisco, which is a well-known manufacturer.

5. Designated replays

These are replays that keep a connection alive by responding with a signal periodically.

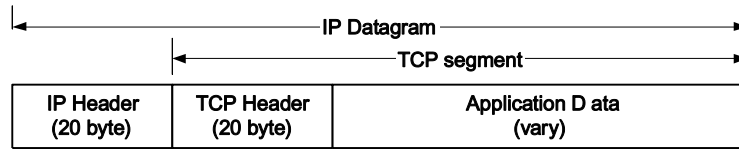
Watch Dog in IPX/SPX, TCP/IP in TCP, and Net BT (NetBIOS on TCP/IP) in Windows NT are all well known techniques to keep a live connection.

10.4 Transport Layer

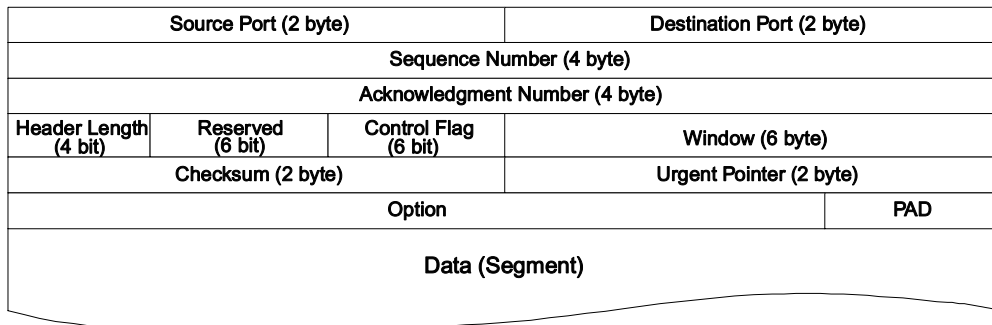
10.4.1 TCP (Transmission Control Protocol)

The TCP (Transmission Control Protocol) is an internetwork connection-oriented protocol that corresponds to the OSI Transport layer. TCP provides full-duplex, end-to-end connections. When the end-to-end communication acknowledgement is not required, the UDP (User Datagram Protocol) can be substituted for the TCP at the Transport (host-to-host) level. TCP and UDP operate at the same layer.

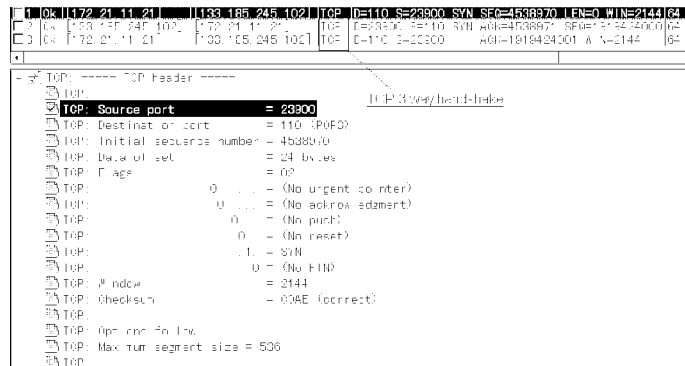
The UDP is a connectionless oriented protocol.



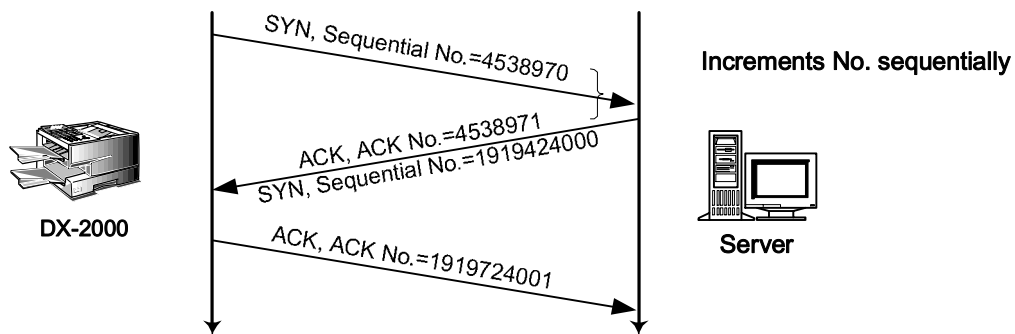
TCP Segment in IP Datagram



TCP Segment Outline



TCP Header Monitoring Sample



TCP 3 Handshake General Flowchart

The client (DX-2000) generates random sequential numbers initially and sends them to the server. The initial sequential numbers are synchronized with the clock and increments the counter every 4 msec.

The Server responds with an acknowledgement that increments the initial sequential number by one. The ACK bit number is also changed to a "1" value. The "SYN" can have an identical "ACK" response for each packet, thus, the server and the client can establish a connection.

10.5 Upper Layer

10.5.1 DNS (Domain Name System)

The DNS (Domain Name System) protocol provides host name and IP address resolution as a service to client applications. DNS servers enable humans to use logical node names, utilizing a fully qualified domain name structure, to access network resources. Domain Names are comprised of 2 or more parts, separated by dots. The part on the left is the most specific, and the part on the right is the most general. A given device may have more than one Domain Name but a given Domain Name points to only one device. For example, the Domain Names below,

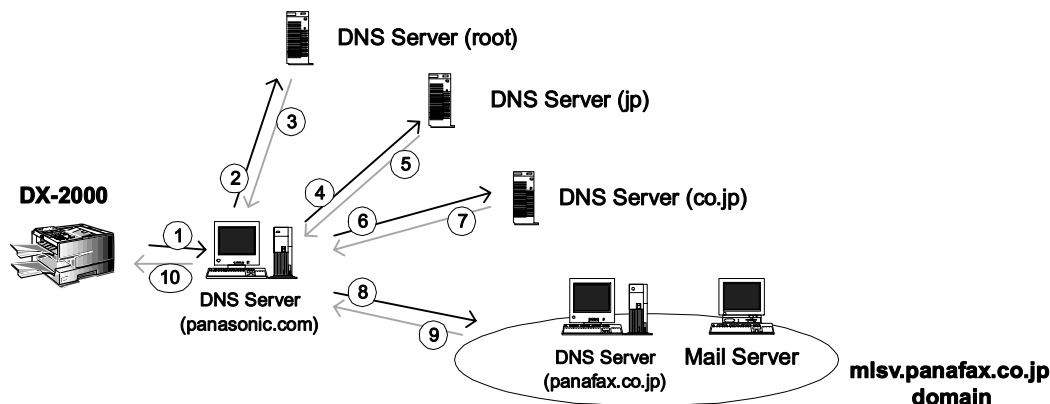
Panasonic.com
Mail.panasonic.com
ifax.panasonic.com

can all refer to the same device, but each domain name can refer to no more than one device.

Usually, all of the devices on a given network will have the same right-hand portion of their Domain Names (i.e. panasonic.com in the examples above). It is also possible for a Domain Name to exist but not be connected to an actual device. This is often done so that a group or business can have an Internet email address without having to establish a real Internet site. In these cases, some real Internet machine must handle the email on behalf of the listed Domain Name.

Specification for this name system follows this basic guideline.

- The name must be separated by dots and must start with ASCII code.
- Only Alpha numeric and hyphen are available.
- Up to 63 characters maximum, separated by dots.
- Up to 255 characters maximum, including all dots.
- Capital letters and small letters are not identical. (Case Sensitive.)



DNS Name Resolution Sample

The advantage of using a DNS server over a host lookup table, for host name resolution, is to avoid the need for a single centralized clearinghouse for all names. The authority for this information can be delegated to different organizations on the network responsible for it.

There are at least 10 Root DNS servers installed all over the world.

The Name resolution flow is shown in the illustration above and follows the sequence below:

1. Query the local DNS Server.
2. Query the root DNS Server because the domain belongs to a destination outside of the company.
3. Com root DNS Server sends the query to the jp root DNS Server.
4. The procedure repeats until a final name resolution is available.
5. The panafax.co.jp server responds with an IP address for the query name.
6. Finally, the name resolution is completed and the destination IP address is determined.

All DNS servers makes an effort to resolve the query name with an IP address, however, a response is not always sent out every time. Once a name resolution is completed, the information from the DNS Server IP address table is kept in cache memory at each DNS server in accordance with a minimum TTL (Time To Live) of SOA (Start Of Authority) record. There are two types of Name Servers, Primary and Secondary Name Server.

10.5.2. Primary Name Server

A primary server has the original copy of a zone file. Any changes made to the zone file are made to the copy on the primary server. When a primary server receives a query about a host name in its own zone, it retrieves the host resolution locally from its own zone files.

10.5.3 Secondary Name Server

A secondary server gets a copy of zone files from another server. This zone file is a read-only copy of the original file from the primary server. Any changes made to the zone file are made at the primary server, then the changes are copied down to the secondary server through a zone transfer. Multiple secondary servers in a domain improves performance.

10.5.4 SOA (Start of Authority) Record

Each database file starts with a Start of Authority (SOA) record for the file. This record specifies the zone's primary server, the server that maintains the read/write copy of the file. The syntax of this record is as follows:

IN SOA <source host><contact email><serial No.><refresh time><retry time><expiration time><TTL>

An example of the syntax is shown below:

```
;
; File:      db.127.0.0 file
; Purpose:   This file establishes the identity of this DNS.
;           SOA stands for 'start of authority' and sets the
;           default parameters for information this DNS is
;           authoritative for:
;
; @          IN SOA      nwr42.rdmg.mgcs.mei.co.jp. hostmaster.rdmg.mgcs.mei.co.jp. (
;           951213      ; serial number
;           43200       ; refresh every 12 hours
;           7200        ; retry after 2 hours
;           1209600     ; expire after 2 weeks
;           172800     ; default ttl is 2 days
;
;           IN NS       nwr42.rdmg.mgcs.mei.co.jp.
1          IN PTR       localhost.rdmg.mgcs.mei.co.jp.
;
```

SOA Record (Bind 4.9.5 for NT) in "db.127.0.0" file

The "@" symbol in this example indicates the local server; "IN" indicates an Internet record. The FQDN for the name server NWR18 must end in a period. Note that the email address for the administrator must have a period instead of the "@" symbol. Also, if the SOA record is on more than one line, an open parenthesis must end the first line, and a close parenthesis must end the last line.

The following list explains the other parameters:

- * **Source host:** The name of the host that has the read/write copy of the zone file.
- * **Contact email:** The Internet email address of the person who maintains this file. This address must be expressed with a period instead of the "@" that is usually found in email addresses (i.e. hostmaster.rdmg.mgcs.mei.co.jp instead of hostmaster@rdmg.mgcs.mei.co.jp).
- * **Serial number:** A version number for the zone file. This number should be changed each time the zone file changes, it changes automatically if you use DNS Manager to change the zone file.
- * **Refresh time:** The time, in seconds, that a secondary server waits before checking the master server for changes to the database file. If the file has changed, the secondary server requests a zone transfer.
- * **Retry time:** The time, in seconds, that a secondary server waits before trying again if a zone transfer fails.
- * **Expiration time:** The time, in seconds, that a secondary server keeps trying to transfer a zone. After the expiration time passes, the old zone information is deleted.
- * **TTL:** The time, in seconds, that a server can cache resource records from this database file. The TTL is sent as part of the response for any queries that are answered from this database file. An individual resource record can have a TT: that overrides this value.

10.5.5 A (Address) Record

The A (Address) Record, lists the addresses for a given machine. The name field is the machine's name and the address is the network address. There should be one A record for each address on the machine.

```
; BIND version named 4.9.5-Rel+-Monday-11-November-96
; BIND version GregSchueman-LarryKahn-VirajBais
; zone 'rdmg.mgcs.mei.co.jp' last serial 720
; from 133.185.245.7 at Sun Sep 12 19:11:35 1999
$ORIGIN mgcs.mei.co.jp.
rdmg      IN      SOA      nwmgr.mgcs.mei.co.jp. postmaster.rdmg.mgcs.mei.co.jp. (
          721 10800 3600 604800 86400 )
          IN      NS       nwmgr.mgcs.mei.co.jp.
          IN      MX       10 mlsv2.rdmg.mgcs.mei.co.jp.
$ORIGIN rdmg.mgcs.mei.co.jp.
ifax-gz03 IN      A       172.21.94.216
qmc-cco1  IN      A       133.185.254.212
ifaxos01 IN      A       172.21.97.26
ifpdyna   IN      A       202.244.202.29
```

A Record (Bind 4.9.5 for NT) in "db zone.info" file

10.5.6 PTR (Pointer) Record

Pointer records are the reverse-lookup file entries that enable IP addresses to be resolved to host names. DNS is used to resolve host names to IP addresses, so the opposite process is called reverse lookup. They specify the IP address in reverse order (like a DNS name, with the most specific information first) and then corresponding host name. The files are named according to the class of network, but with the octets in reverse order. The syntax for a PTR record is shown below:

<ip reverse domain name> IN PTR <host name>

```
      IN NS      nwr42.rdmg.mgcs.mei.co.jp.
1     IN PTR     localhost.rdmg.mgcs.mei.co.jp.
;
```

PTR record (Bind 4.9.5 for NT) in "db.127.0.0" file.

10.5.7 CNAME (Canonical Name) Record

The CNAME (or canonical name) record is an alias (nickname), enabling you to specify more than one name for each IP address. The syntax of a CNAME is shown below:

<alias name> CNAME <host name>

Using CNAME records, you can combine an FTP and a Web server on the same host. Nicknames are useful when a well-known host changes its name. In this case, it's usually a good idea to have a CNAME record so people still using the old name, will get to the right place.

10.5.8 NS (Name Server) Record

The Name Server record specifies the other name servers for a domain. The syntax for a name server record is shown below:

<domain> IN NS <nameserver host>

An example of a name server record follows below:

@ IN NS nwmgr.mgcs.mei.co.jp

The "@" symbol indicates the local domain. The server "nwmgr" in the domain "mgcs.mei.co.jp" is the name server.

10.5.9 MX (Mail Exchange) Record

The Mail Exchange (MX) record specifies the name of the host that processes mail for this domain. If you list multiple mail servers, you can set a preference number (value) that specifies the order in which the mail server should be used. Note that lower values indicate higher precedence, and that mailers are supposed to randomize same-value MX hosts so as to distribute the load evenly if values are equal. If the first preferred mail server does not respond, the second one is contacted, and so on.

If you want a host to receive its own mail, you should create an MX record for your host's name, pointing at your host's name. The syntax of this record is shown below:

```
<domain> IN MX <preference> <mailserver host>
```

For a more detail, please refer to RFC974 document at URL <http://www.ietf.org/>.

10.5.10 Reverse Lookup

This is a special domain for allowing address to name mapping. As Internet host addresses do not fall within domain boundaries, this special domain was formed to allow inverse mapping. The IN-ADDR.ARPA domain has four labels preceding it. These labels correspond to the 4 octets of an Internet address. All four octets must be specified even if an octet contains zero. The Internet address 128.32.0.4 is located in the domain 4.0.32.128.IN-ADDR.ARPA. This reversal of the address is awkward to read but allows for the natural grouping of hosts in a network.

10.5.11. Forwarding

A Slave Server is a server that always forwards queries it cannot satisfy from its cache, to a fixed list of forwarding servers instead of interacting with the name servers for the root and other domains. The queries to the forwarding servers are recursive queries. There may be one or more forwarding servers, and they are tried in turn until the list is exhausted. A Slave and forwarder configuration is typically used when you do not wish all the servers at a given site to interact with the rest of the Internet servers. A typical scenario would involve a number of workstations and a departmental timesharing machine with Internet access. The workstations might be administratively prohibited from having Internet access. To give the workstations the appearance of access to the Internet domain system, the workstations could be Slave servers to the timesharing machine, which would forward the queries and interact with other name servers to resolve the query before returning the answer. An added benefit of using the forwarding feature is that the central machine develops a much more complete cache of information that all the workstations can take advantage of. The use of Slave mode and forwarding is discussed further under the description of the named bootfile commands. There is no prohibition against declaring a server to be a slave even though it has primary and/or secondary zones as well; the effect will still be that anything in the local server's cache or zones will be answered, and anything else will be forwarded using the forwarders list.

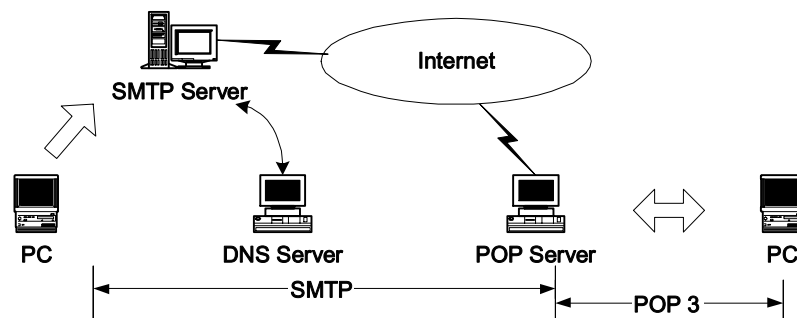
For more detail, please refer to published book (i.e. DNS and BIND etc) provided from O' Reilly & Associates. Inc.

10.6 SMTP (Simple Mail Transfer Protocol)

The objective of Simple Mail Transfer Protocol (SMTP) is to transfer mail reliably and efficiently.

SMTP is independent of the particular transmission subsystem and requires only a reliable ordered data stream channel.

The SMTP design is based on the following model of communication: as the result of a user mail request, the sender-SMTP establishes a two-way transmission channel to a receiver-SMTP. The receiver-SMTP may be either the ultimate destination or an intermediate. SMTP commands are generated by the sender-SMTP and sent to the receiver-SMTP. SMTP replies are sent from the receiver-SMTP to the sender-SMTP in response to the commands. Once the transmission channel is established, the SMTP-sender sends a MAIL command indicating the sender of the mail. If the SMTP-receiver can accept mail it responds with an OK reply. The SMTP-sender then sends a RCPT command identifying a recipient of the mail. If the SMTP-receiver can accept mail for that recipient it responds with an OK reply, if not, it responds with a reply rejecting that recipient (but not the whole mail transaction). The SMTP-sender and SMTP-receiver may negotiate several recipients. When the recipients have been negotiated the SMTP-sender sends the mail data, terminating with a special sequence. If the SMTP-receiver successfully processes the mail data it responds with an OK reply. The dialog is purposely lock-step, one-at-a-time. For more detail, please refer to the URL <http://www.imc.org/rfc821>



Internet Mail Sending and Receiving

10.6.1 Mail Header Sample

Received: from nwr35 by labo.mgcs.com (8.9.3/3.7W-RDMG) with SMTP id PAA09157 for <freeport@labo.mgcs.com>; Sun, 12 Sep 1999 15:04:48 +0900 (JST)	Delivery route
Date: Sun, 12 Sep 1999 15:04:48 +0900 (JST)	
Message-Id: <199908200604.PAA09157@mlsv2.labo.mgcs.com>	Message ID
Mime-Version: 1.0	
X-Mailer: Internet FAX, MGCS	
From: "MGCS" <ifax98-us@labo.mgcs.com>	
Subject: IMAGE from Internet FAX	
To: freeport@labo.mgcs.com	
Content-Type: multipart/mixed; boundary="+-+--MGCS+-+--"	Content-Type
X-UIDL: 8f32e4b1d691dfc28daa812d913f572	

10.7 ITU T.37 and RFC2305

10.7.1 Mode of operation

The DX-2000 conforms to the ITU T.37 standards and RFC2305. This Internet store and forward facsimile uses approved IETF protocols for posting, relaying and delivery of documents. It requires no changes to Internet standards or to ITU Facsimile Recommendations.

Store and forward facsimiles may operate in one of two modes.

Communicating in the Simple Mode as defined below provides interoperability. All terminals conforming to this recommendation and capable of reception must be able to receive in Simple Mode. It is recommended that terminals conforming to this recommendation and capable of transmitting should, as a minimum, be capable of transmitting in Simple Mode.

Simple Mode supports the transfer of image data. Capability exchange and confirmation of receipt are not required for Simple Mode but may be provided using optional email functions outside the scope of this recommendation.

10.7.2 Implementation Requirements for T.37 Simple Mode Table

Sender

Required	Send data as a single MIME multi-page TIFF Profile S file
	Provide notice in case of local transmission problem
	Provide a return address of an Internet email receiver which is MIME compliant
Strongly recommended	Include Message-ID
	Use Base 64 encoding for image data
Optional	Use other TIFF Profiles if it has prior knowledge that such profiles are supported by the receiver
	Provide notice on receipt of DSN or other notifications

Receiver

Required	Be MIME compliant except that it is not required to offer to place MIME attachment in a file and may print a received file rather than display
	Be capable of processing multiple MIME TIFF Profile S image files within a single message
	Provide notice in case of reception or processing problems
Optional	Use other TIFF Profiles

Offramp Gateway (when implemented)

Required	Be SMTP compliant
	Provide delivery failure notification
	Be able to process PSTN/FAX email address
	Comply with the relevant ITU Recommendations relating to facsimile transmission
	Attempt to relay authorized email to the corresponding G3 facsimile terminals
Strongly recommended	Ensure DSN for delivery failure notification
	Use DSN for delivery failure notification
	Use an approved mailbox access protocol when serving multiple users
Optional	Translate image data into a format acceptable by the receiving G3 facsimile terminal
	Use a mailbox access protocol when serving a single mail recipient

10.7.3 Definitions and Abbreviations

IETF	Internet Engineering Task Force
RFC	Request For Comment
MIME	Multipurpose Internet Mail Extensions
POP3	Post Office Protocol version 3
SMTP	Simple Mail Transfer Protocol
DSN	Delivery Status Notification
MDN	Message Disposition Notification
TIFF	Tagged Image File Format
IFD	TIFF Image File Directory
Offramp gateway	Equipment capable of receiving email and relaying to one or more G3/G4 facsimile terminals
Mailstore	Equipment capable of receiving email and storing it for retrievals by receiver
Notice	Provision of status information to the originator or recipient in a manner to be determined by the device

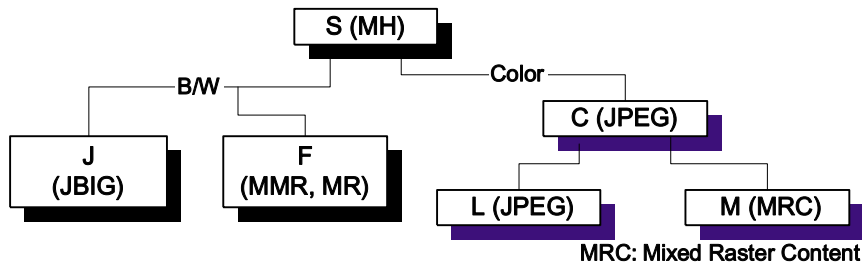
RFC reference <http://www.imc.org/ietf-fax/>

File Format for Internet Fax	RFC2301
Tag Image File Format (TIFF) image/tiff MIME Sub-type Registration	RFC2302
Minimal PSTN address format in Internet Mail	RFC2303
Minimal FAX address format in Internet Mail	RFC2304
A simple Mode of Facsimile Using Internet Mail	RFC2305
Tag Image File Format (TIFF)-F Profile for facsimile	RFC2306

10.7.4 File Format for Internet Fax

Sending Internet Fax devices must be able to write minimum set TIFF files, according to the rules for creating minimum set TIFF files defined in TIFF for Facsimile (the S profile) [RFC2301], which is also compatible with the specification for the minimum subset of TIFF-F in [RFC2306]. Receiving Internet Fax devices MUST be able to read minimum set TIFF files.

The Following tree diagram shows the relationship among profiles and between profiles and coding methods.



A profile is based on a collection of ITU-T facsimile coding methods.

Class	Color	Coding method	Remarks
S	B/W	MH	Internet Fax minimal set
F	B/W	MMR, MR	Internet Fax full mode
J	B/W	JBIG	Internet Fax mixed mode
C	Color	JPEG (lossy)	Color minimal set
L	Color	JPEG (lossless, grayscale)	One bit per color, palletized color image, continuous tone color and grayscale images
M	Color	Mixed Raster Content	Multiple coders and resolution within a page

10.7.5 Minimal Set

The minimum interchange set of TIFF fields that must be supported by all implementations in order to assure that some form of an image, albeit black-and-white, can be interchanged. The table below summarizes the TIFF fields that comprise the minimal interchange set for black-and-white facsimile. The Baseline and Extension fields and fields values must be supported by all implementations.

Baseline Fields	Values
Bits Per Sample	1
Compression	3:1 dimension MH coding set T4 Options = 0 or 4
Fill Order	Least significant bit first
Image Width	1728 (A-4)
Image Length	N: total number of scan lines in image
New Sub File Type	2: Bit 1 identifies single page of a multi-page document
Page Number	N,m: page number n followed by total page count m
Photometric Interpretation	0: pixel value 1 means black
Resolution Unit	2: inch
Rows Per Strip	Number of scan lines per strip = Image length, with one strip
Samples Per Pixel	1
Strip Byte Counts	Number of byte in TIFF strip
Strip Offsets	Offsets from beginnings of file to single TIFF strip
X Resolution	204, 200 (pixels/inch)
Y Resolution	98, 196, 100, 200 (pixels/inch)
Extensions Fields	
T4 Options	0: MH coding, EOLs not byte aligned 4: MH coding, EOLs byte aligned

10.7.6 Addressing

A simple method of encoding PSTN addresses in the local-part of Internet email addresses, along with an extension mechanism to allow encoding of additional standard attributes needed for email gateway to PSTN-based services.



Note:

For RFC2305, a PSTN address in an email address should follow the above style. The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119. URL <http://www.imc.org/rfc2119>

1. MUST

This word, or the terms "REQUIRED" or "SHALL", means that the definition is an absolute requirement of the specification.

2. MUST NOT

This phrase, or the phrase "SHALL NOT", means that the definition is an absolute prohibition of the specification.

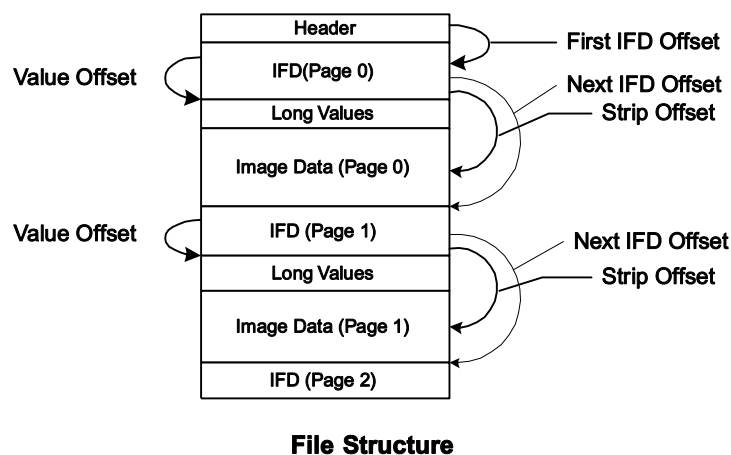
3. SHOULD

These words, or the adjective "RECOMMENDED", means that there may exist valid reasons in particular circumstances to ignore a particular item, but the full implications must be understood and carefully weighed before choosing a different course.

4. SHOULD NOT

This phrase, or the phrase "NOT RECOMMENDED" means that there may exist valid reasons in particular circumstances when the particular behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.

10.7.7 Coding Example of a TIFF Header, IFD and Image data



```

14 Ok mlsy2.rdmg.mgcs.mei.co.jp nwr35 (Internet FAX) SMTP R PORT=25 250 <
15 Ok nwr35 (Internet FAX) mlsy2.rdmg.mgcs.mei.co.jp SMTP C PORT=25 RCPT
16 Ok mlsy2.rdmg.mgcs.mei.co.jp nwr35 (Internet FAX) SMTP R PORT=25 250 <
17 Ok nwr35 (Internet FAX) mlsy2.rdmg.mgcs.mei.co.jp TCP D=25 S=32424
18 Ok nwr35 (Internet FAX) mlsy2.rdmg.mgcs.mei.co.jp SMTP C PORT=25 DATA
19 Ok mlsy2.rdmg.mgcs.mei.co.jp nwr35 (Internet FAX) SMTP R PORT=25 354 E
20 Ok nwr35 (Internet FAX) mlsy2.rdmg.mgcs.mei.co.jp SMTP C PORT=25 Text
21 Ok mlsy2.rdmg.mgcs.mei.co.jp nwr35 (Internet FAX) TCP D=32424 S=25
22 Ok nwr35 (Internet FAX) mlsy2.rdmg.mgcs.mei.co.jp SMTP C PORT=25 Text
23 Ok mlsy2.rdmg.mgcs.mei.co.jp nwr35 (Internet FAX) TCP D=32424 S=25

```

```

IP: Destination address = [133.185.245.7], mlsy2.rdmg.mgcs.mei.co.jp
IP: No options
IP:
TCP: ----- TCP header -----
TCP:
TCP: Source port          = 32424
TCP: Destination port    = 25 (SMTP)
TCP: Sequence number     = 54854
TCP: Acknowledgment number = 3085835849
TCP: Data offset         = 20 bytes
TCP: Flags                = 18
TCP: ..0. .... = (No urgent pointer)
TCP: ....1 .... = Acknowledgment
TCP: ....1 .... = Push
TCP: ....0.. = (No reset)
TCP: ....0.. = (No SYN)
TCP: ....0.. = (No FIN)
TCP: Window              = 2144
TCP: Checksum             = 2BAA (correct)
TCP: No TCP options
TCP: [220 byte(s) of data]
TCP:
SMTP: ----- Simple Mail Transfer Protocol -----
SMTP:
SMTP: Line 1: Mime-Version: 1.0
SMTP: Line 2: Content-Type: multipart/mixed; boundary="~+--+MGCS~+--+~"
SMTP: Line 3: X-Mailer: Internet FAX, MGCS
SMTP: Line 4: From: "MGCS" <ifax98-us@rdmg.mgcs.mei.co.jp>
SMTP: Line 5: Subject: IMAGE from Internet FAX
SMTP: Line 6: To: freeport@mgcs.mei.co.jp
SMTP: Line 7:
SMTP:

```

Message Header Contents

10.7.8 Delivery Failure

In the event of relay failure, the sending relay must generate a failure message, which should be in the format of a DSN.

10.7.9 Image File Format

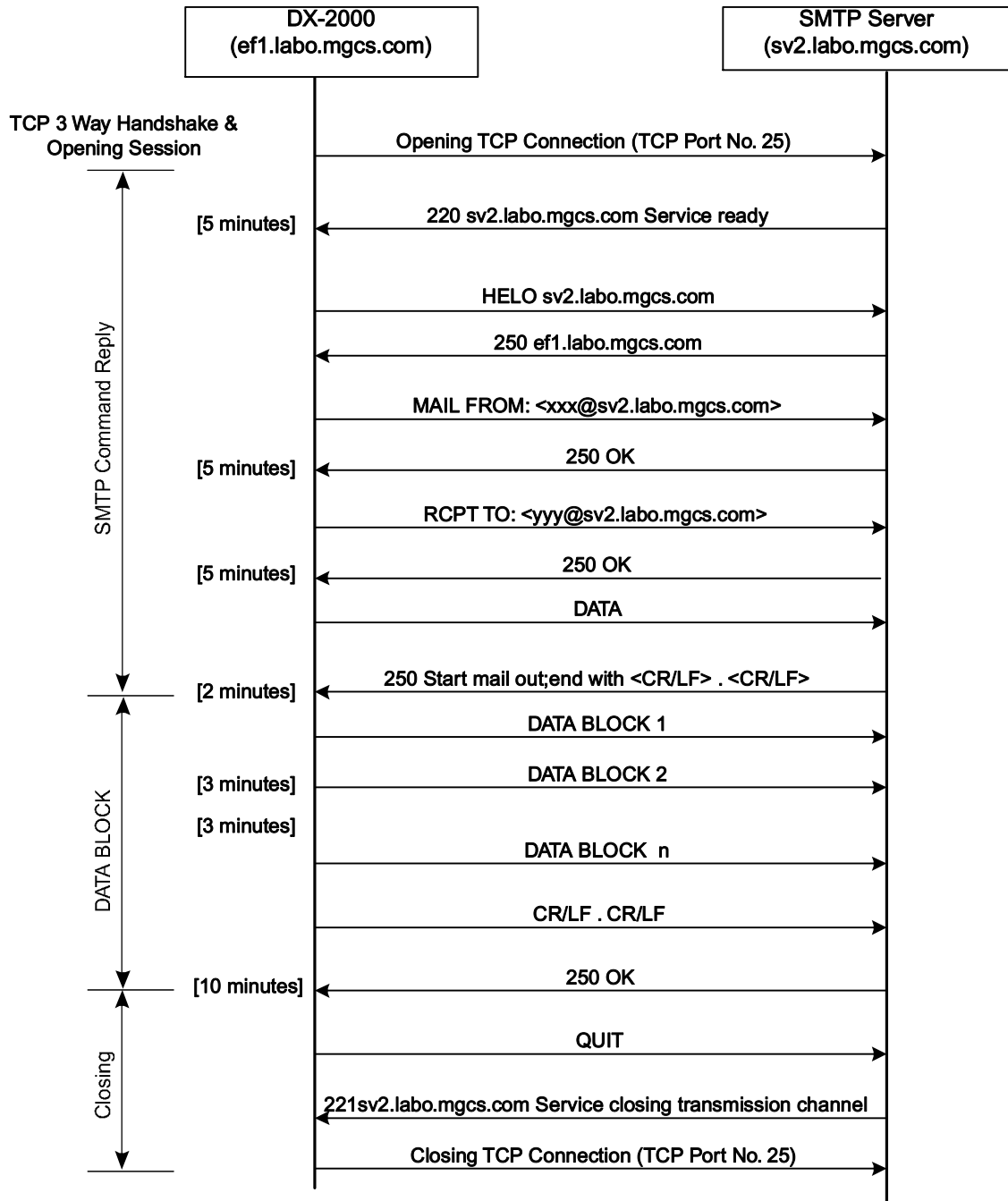
The Sending Internet Fax devices **MUST** be able to write minimum set TIFF files, according to the rules for creating minimum set TIFF files defined in TIFF for Facsimile (the S profile), which is also compatible with the specifications for the minimum subset of TIFF-F in F Profile for Facsimile, RFC 2306. The Receiving Internet Fax devices must be able to read minimum set TIFF files.

10.8 Communication Protocols

The set of conventions necessary to achieve facsimile-compatible service covers basic data transport, document data formats, message (document) addressing, delivery confirmation, and message security.

Protocol supported by the DX-2000 is as follows:

SMTP Command & Reply Procedure



According to RFC1123, there are two approaches for timeouts in the sender-SMTP:

1. limit the time for each SMTP command separately, or
2. limit the time for the entire SMTP dialogue for a single mail message.

A sender-SMTP SHOULD use option (a), per-command timeouts.

Timeouts SHOULD be easily reconfigurable, preferably without recompiling the SMTP code.

The value of timer [] shown above are recommended by RFC1123.

10.8.1. Opening and Closing

At the time the transmission channel is opened there is an exchange of commands to ensure that the hosts are communicating with the hosts they think they are. The following two commands are used in the transmission channel for opening and closing:

```
HELO:<SP> <domain> <CRLF>
QUIT:<CRLF>
```

In the HELO command, the host sending the command identifies itself; the command may be interpreted as saying, "Hello, I am <domain>".

10.8.2 Mail (MAIL)

This command is used to initiate a mail transaction in which the mail data is delivered to one or more mailboxes.

10.8.3 RECIPIENT (RCPT)

This command is used to identify an individual recipient of the mail data; multiple recipients are specified by multiple uses of this command.

10.8.4 Data (DATA)

The receiver treats the lines following the command as mail data from the sender. This command causes the mail data from this command to be appended to the mail data buffer. The mail data may contain any of the 128 ASCII character codes. The mail data is terminated by a line containing only a period, that is the character sequence "<CRLF>.<CRLF>". This is the end of mail data indication.

10.8.5 Send

This command is used to initiate a mail transaction in which the mail data is delivered to one or more terminals. This command is successful if the message is delivered to a terminal.

10.8.6. Reset (RSET)

This command specifies that the current mail transaction is to be aborted. Any stored sender, recipients, and mail data must be discarded, and all buffers and state tables cleared. The receiver must send an OK reply.

10.8.7 Verify (VRFY)

This command asks the receiver to confirm that the argument identifies a user. If it is a user name, the full name of the user (if known) and the fully specified mailbox are returned.

10.8.8 Quit (QUIT)

This command specifies that the receiver must send an OK reply, and then close the transmission channel.

10.8.9 Reply Codes from SMTP Server

SMTP is independent of the particular transmission subsystem and requires only a reliable ordered data stream channel. The SMTP design is based on the following model of communication: as the result of a user mail request, the sender-SMTP establishes a two-way transmission channel to a receiver-SMTP. The receiver-SMTP may be either the ultimate destination or an intermediate. SMTP commands are generated by the sender-SMTP and sent to the receiver-SMTP. SMTP replies are sent from the receiver-SMTP to the sender-SMTP in response to the commands.

10.8.10 NUMERIC ORDER LIST OF REPLY CODES

- 211 System status or system help reply
- 220 <domain> Service ready
- 221 <domain> Service closing transmission channel
- 250 Requested mail action okay# completed
- 251 User not local; will forward to <forward-path>
- 354 Start mail input; end with <CRLF>.<CRLF>
- 421 <domain> Service not available: closing transmission channel
[This may be a reply to any command if the service knows it must shut down]
- 450 Requested mail action not taken: mailbox unavailable
[E.g.# mailbox busy]
- 451 Requested action aborted: local error in processing
- 452 Requested action not taken: insufficient system storage
- 500 Syntax error# command unrecognized
[This may include errors such as command line too long]
- 501 Syntax error in parameters or arguments
- 502 Command not implemented
- 503 Bad sequence of commands
- 504 Command parameter not implemented
- 550 Requested action not taken: mailbox unavailable
[E.g.# mailbox not found# no access]
- 551 User not local; please try <forward-path>
- 552 Requested mail action aborted: exceeded storage allocation
- 553 Requested action not taken: mailbox name not allowed
[E.g.# mailbox syntax incorrect]
- 554 Transaction failed

10.9 POP (Post Office Protocol Version 3)

10.9.1 Introduction

On certain types of smaller nodes in the Internet it is often impractical to maintain a message transport system (MTS). For example, a workstation may not have sufficient resources (cycles, disk space) in order to permit a SMTP server and associated local mail delivery system to be kept resident and continuously running. Similarly, it may be expensive (or impossible) to keep a personal computer interconnected to an IP-style network for long amounts of time.

The Post Office Protocol - Version 3 (POP3) is intended to permit a workstation to dynamically access a maildrop on a server host in a useful fashion. Usually, this means that the POP3 protocol is used to allow a workstation to retrieve mail that the server is holding for it.

For more detail, please refer to URL of [http:// www.imc.org/rfc1939](http://www.imc.org/rfc1939)

10.9.2 Basic Operation

Initially, the server host starts the POP3 service by listening on TCP Port No. 110. When a client host wishes to make use of the service, it establishes a TCP connection with the server host. When the connection is established, the POP3 server sends a greeting. The client and POP3 server then exchange commands and responses (respectively) until the connection is closed or aborted.

Commands in the POP3 consist of a case-insensitive keyword, possibly followed by one or more arguments. All commands are terminated by a CRLF pair. Keywords and arguments consist of printable ASCII characters. Keywords and arguments are each separated by a single SPACE character. Keywords are three or four characters long. Each argument may be up to 40 characters long.

Responses in the POP3 consist of a status indicator and a keyword possibly followed by additional information. All responses are terminated by a CRLF pair. Responses may be up to 512 characters long, including the terminating CRLF. There are currently two status indicators: positive ("OK") and negative ("-ERR"). Servers MUST send the "OK" and "-ERR" in upper case.

Responses to certain commands are multi-line. In these cases, which are clearly indicated below, after sending the first line of the response and a CRLF, any additional lines are sent, each terminated by a CRLF pair. When all lines of the response have been sent, a final line is sent, consisting of a termination octet (decimal code 046, ".") and a CRLF pair. If any line of the multi-line response begins with the termination octet, the line is "byte-stuffed" by pre-pending the termination octet to that line of the response.

Hence a multi-line response is terminated with the five octets "CRLF.CRLF". When examining a multi-line response, the client checks to see if the line begins with the termination octet. If so and if octets other than CRLF follow, the first octet of the line (the termination octet) is stripped away. If so and if CRLF immediately follows the termination character, then the response from the POP server is ended and the line containing ".CRLF" is not considered part of the multi-line response.

A POP3 session progresses through a number of states during its lifetime. Once the TCP connection has been opened and the POP3 @server has sent the greeting, the session enters the AUTHORIZATION state. In this state, the client must identify itself to the POP3 server. Once the client has successfully done this, the server @acquires resources associated with the client's maildrop, and the session enters the TRANSACTION state. In this state, the client requests actions on the part of the POP3 server. When the client has issued the QUIT command, the session enters the UPDATE state. In this state, the POP3 server releases any resources acquired during @the TRANSACTION state and says goodbye. The TCP connection is then closed.

A server MUST @respond to an unrecognized, unimplemented, or @syntactically invalid command by responding with a negative status @indicator. A server MUST respond to a command issued when the session is in an incorrect state by responding with a negative status indicator. There is no general method for a client to distinguish between a server which does not implement an optional command and a server which is unwilling or unable to process the command.

A POP3 server MAY have an inactivity autologout timer. Such a timer MUST be of at least 10 minutes' duration. The receipt of any command from the client during that interval should suffice to reset the autologout timer. When the timer expires, the session does NOT enter the UPDATE state--the server should close the TCP connection without removing any messages or sending any response to the client.

10.9.3 POP3 Command Summary

Minimal POP3 Commands:

USER name valid in AUTHORIZATION state
 PASS string
 QUIT

STAT valid in the TRANSACTION state
 LIST [msg]
 RETR msg
 DELE msg
 NOOP
 RSET
 QUIT

Optional POP3 Commands:

APOP name digest valid in the AUTHORIZATION state

TOP msg n valid in the TRANSACTION state
 UIDL [msg]

POP3 Replies:

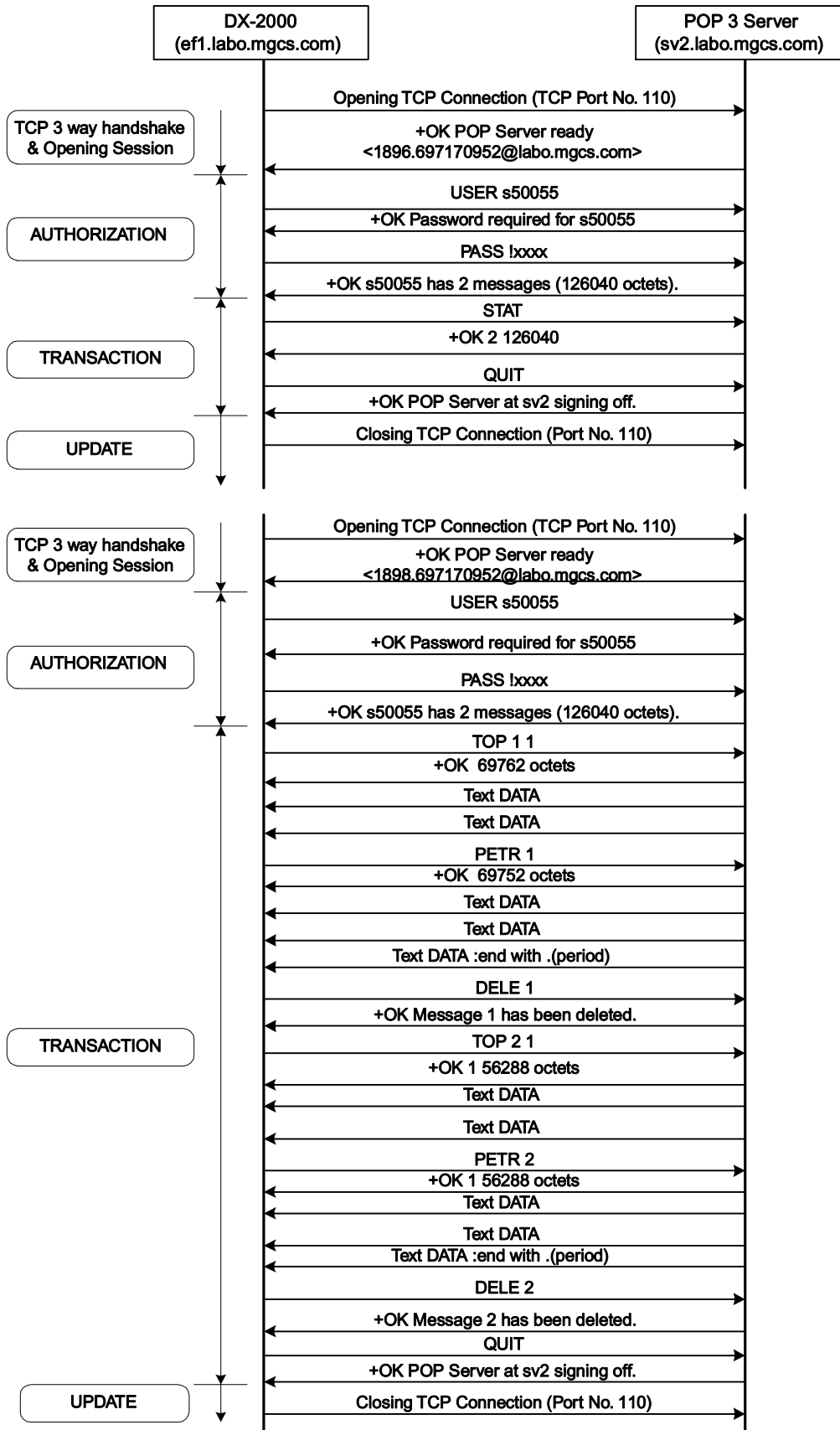
+OK
 -ERR

Note: With the exception of the STAT, LIST, and UIDL commands, the reply given by the POP3 server to any command is significant only to "+OK" and "-ERR". The client may ignore any text occurring after this reply.

Form:	To:
1 Ok [172.21.11.19]	[133.185.245.20] TOP D=110 S=12270 SYN SEQ=14220350 LEN=0 WIN=2144
2 Ok [133.185.245.20]	[172.21.11.19] TOP D=12270 S=110 SYN ACK=14220351 SEQ=1205248000 LEN=0 WIN=4
3 Ok [172.21.11.19]	[133.185.245.20] TOP D=110 S=12270 ACK=1205248001 WIN=2144
4 Ok [133.185.245.20]	[172.21.11.19] POP3 R PORT=12270 +OK UCB Pop server (version 1.83beta) at
5 Ok [172.21.11.19]	[133.185.245.20] POP3 C PORT=110 USER p50019
6 Ok [133.185.245.20]	[172.21.11.19] POP3 R PORT=12270 +OK Password required for p50019.
7 Ok [172.21.11.19]	[133.185.245.20] POP3 C PORT=110 PASS p50019
8 Ok [133.185.245.20]	[172.21.11.19] TOP D=12270 S=110 ACK=14220377 WIN=4096
9 Ok [133.185.245.20]	[172.21.11.19] POP3 R PORT=12270 +OK p50019 has 1 message(s) (788 octets).
10 Ok [172.21.11.19]	[133.185.245.20] POP3 C PORT=110 STAT
11 Ok [133.185.245.20]	[172.21.11.19] POP3 R PORT=12270 +OK 1 788
12 Ok [172.21.11.19]	[133.185.245.20] POP3 C PORT=110 QUIT
13 Ok [133.185.245.20]	[172.21.11.19] TOP D=12270 S=110 ACK=14220389 WIN=4096
14 Ok [133.185.245.20]	[172.21.11.19] POP3 R PORT=12270 +OK Pop server at pop01 signing off.

Sample of a POP3 Protocol Log

POP 3 Command & Reply Procedure



10.10 Troubleshooting from a PC

Troubleshooting is an art of seeking out the cause of a problem and eliminating the problem by managing or eliminating the cause. No matter what the problem is on your network, the OSI Reference Model serves as an excellent reference tool to help you locate the area of trouble.

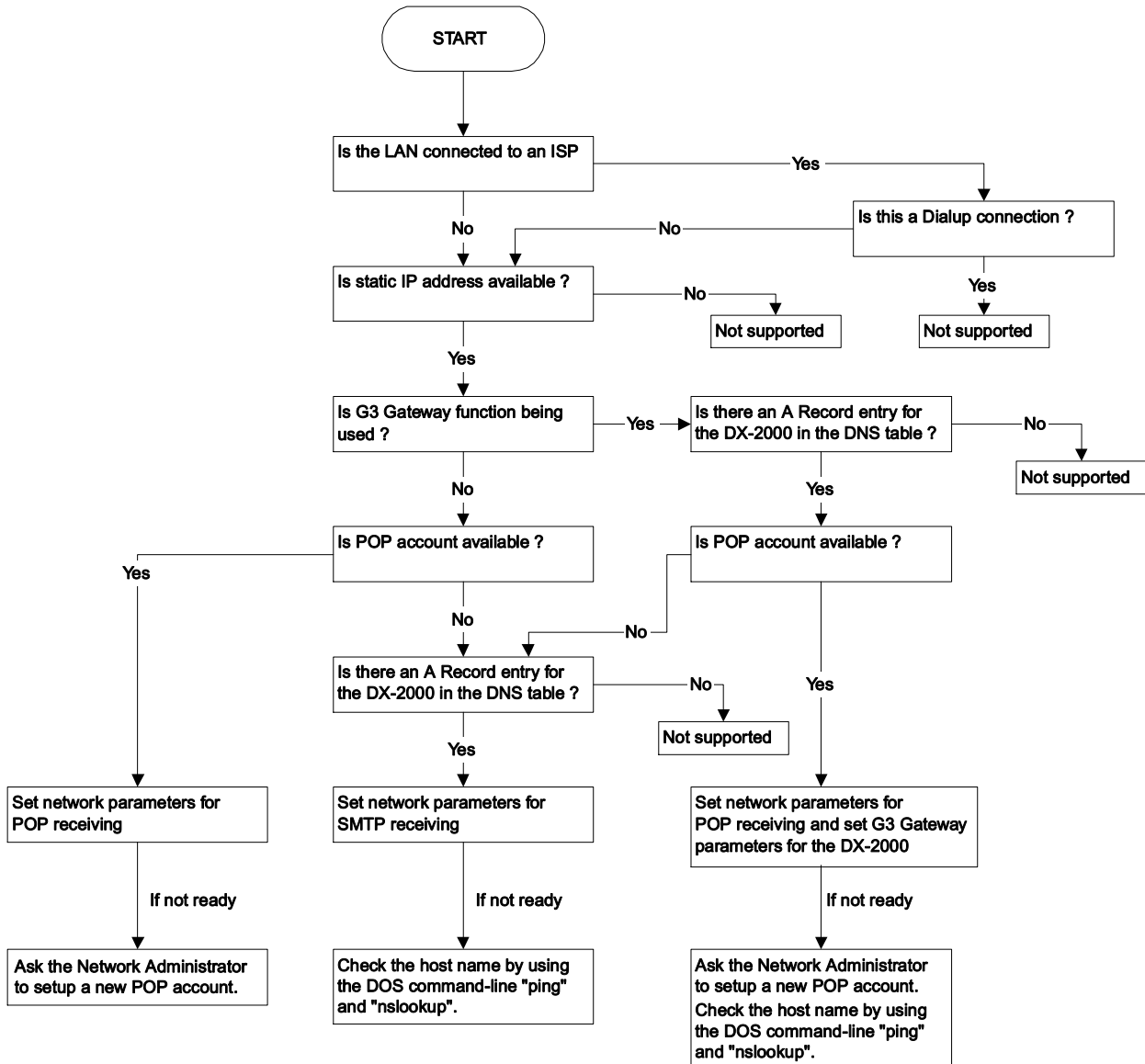
One of the simplest tools available, is the DOS command-line prompt from your Windows PC.

Listed below are the most often used command-line prompts that you can use at the customer's network PC. Some commands are available as an option for checking with more detail.

Command	Sample	Purpose
Ping	Ping 192. 168. 1. 30	Checking for physical connection between your PC and the target destination (192.168.1.30)
Ipconfig /all	Ipconfig /all	Checking for current network configuration (Host Name, DNS server, IP address, Subnet Mask, Default Gateway, MAC address, WINS etc) For Windows 95/98, please type "winipcfg" instead of Ipconfig/all
Tracert	Tracert 192.168.2.245	Checking for the datagram route between your PC and the target destination (192.168.2.245)
Netstat	Netstat Netstat -nr	Active connection list Active route for your subnet. All special assigned IP addresses are also shown
Net view	Net view	Checking for the current file sharing Host Name
Nslookup	Nslookup	Checking for the DNS server IP address. This command is available for Windows NT only.

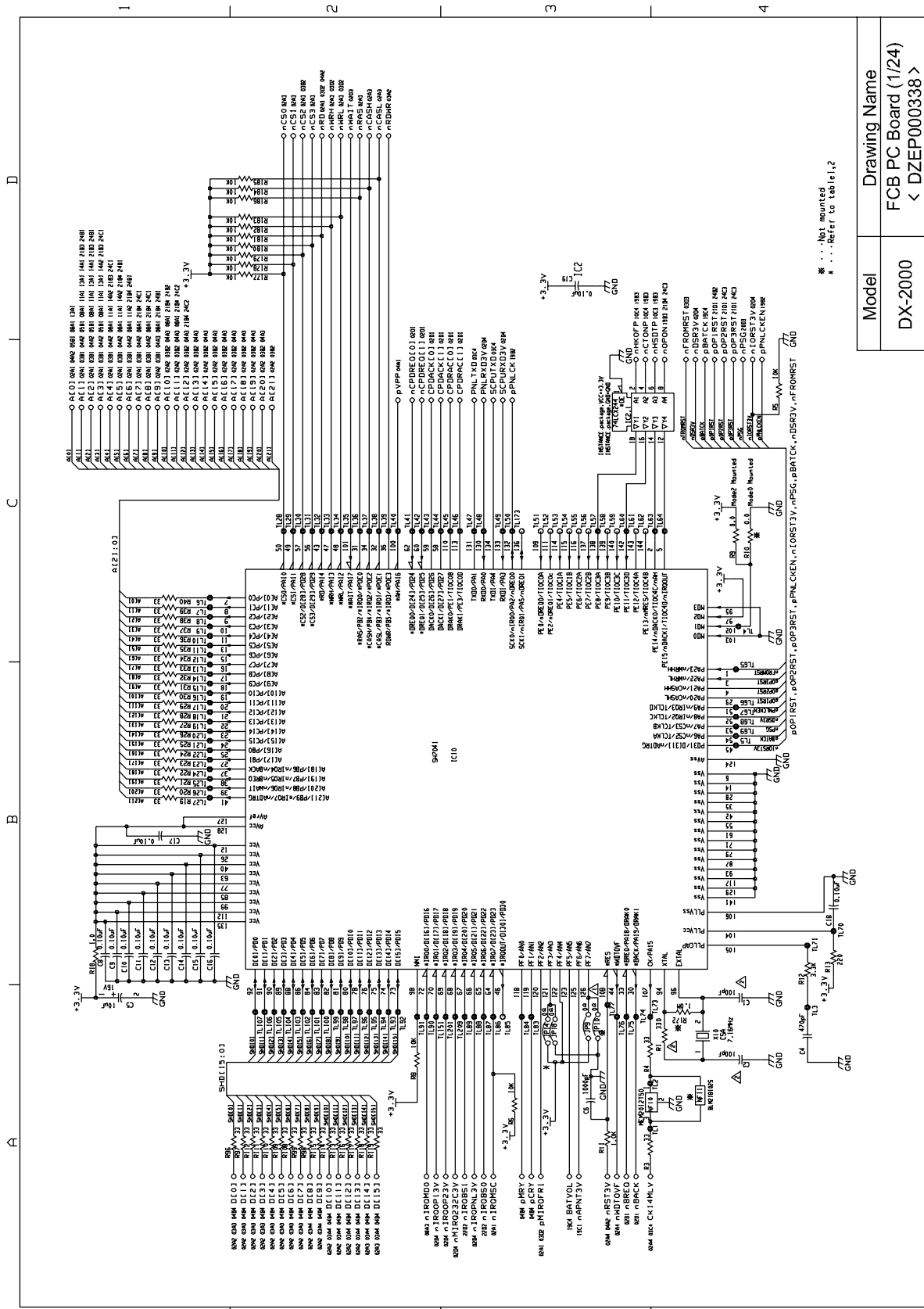
Note: Before taking corrective action, you must check the physical connections or wiring first.

10.11. Verifying the Configuration and Mail Account Type (SMTP or POP)



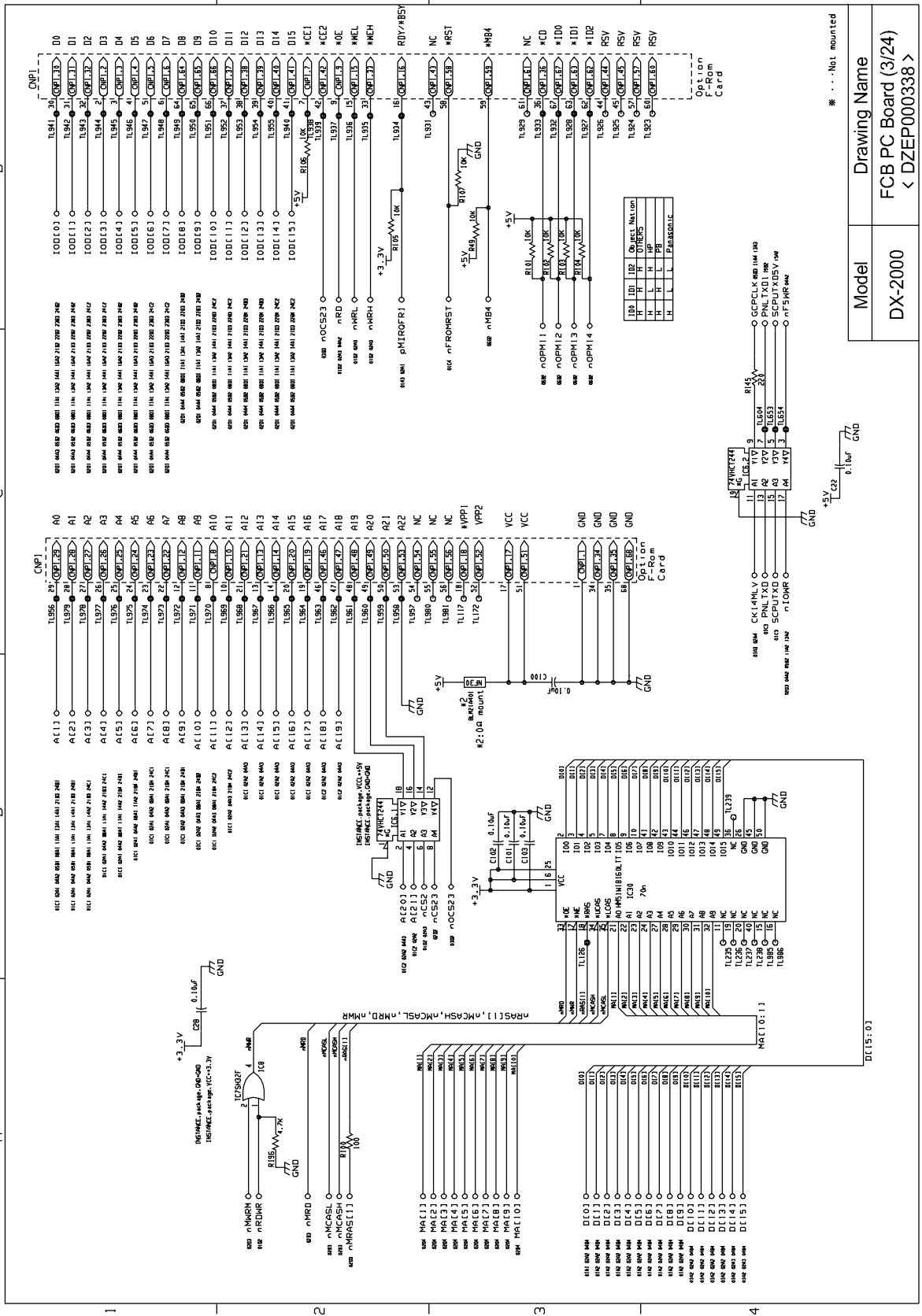
11 Schematic Diagram

11.1. FCB PC Board



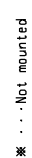
* ... Not mounted
... Refer to table 1, 2

Model	Drawing Name
DX-2000	FCB PC Board (1/24) < DZEP000338 >

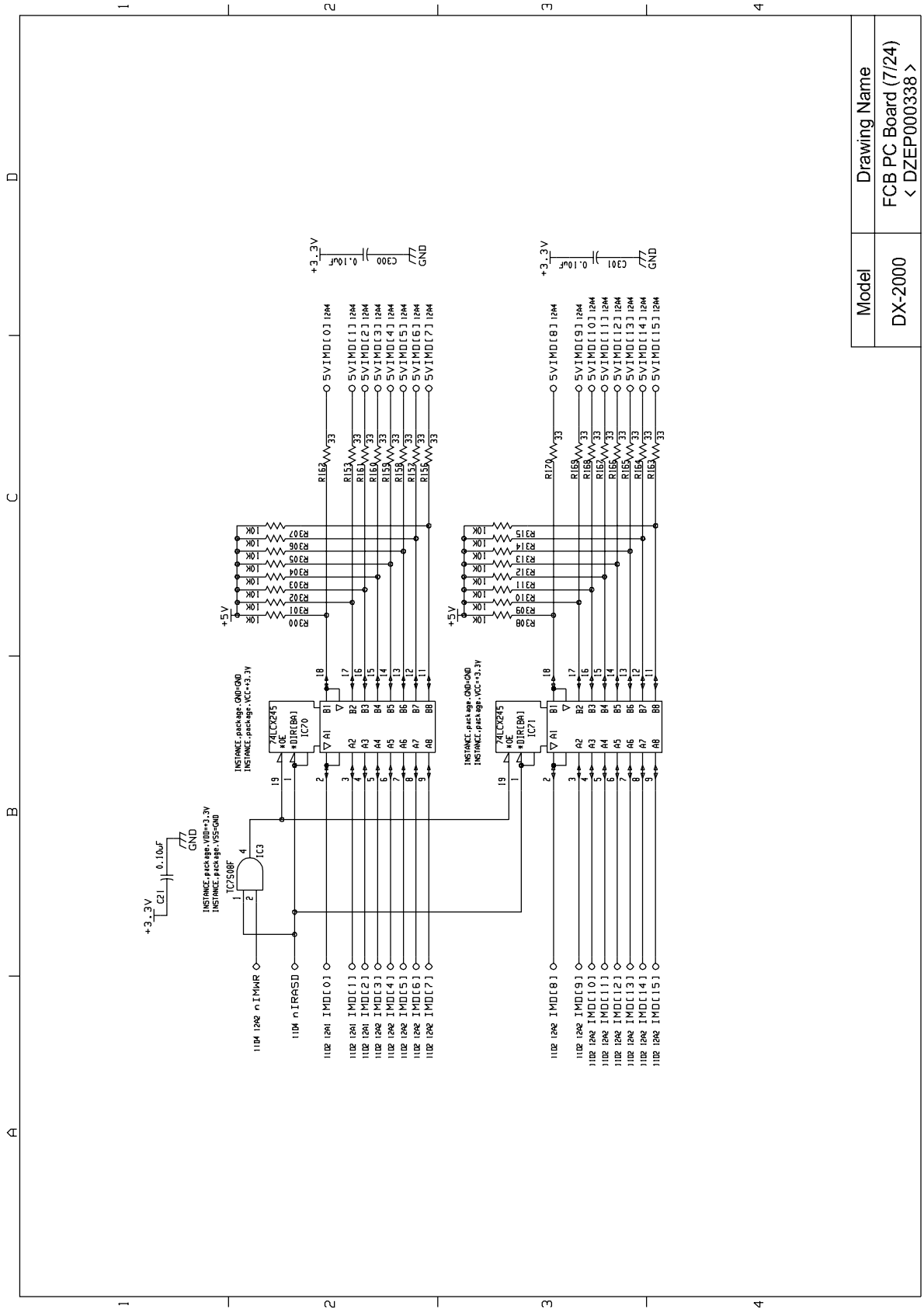


Model	Drawing Name
DX-2000	FCB PC Board (3/24) < DZEP000338 >

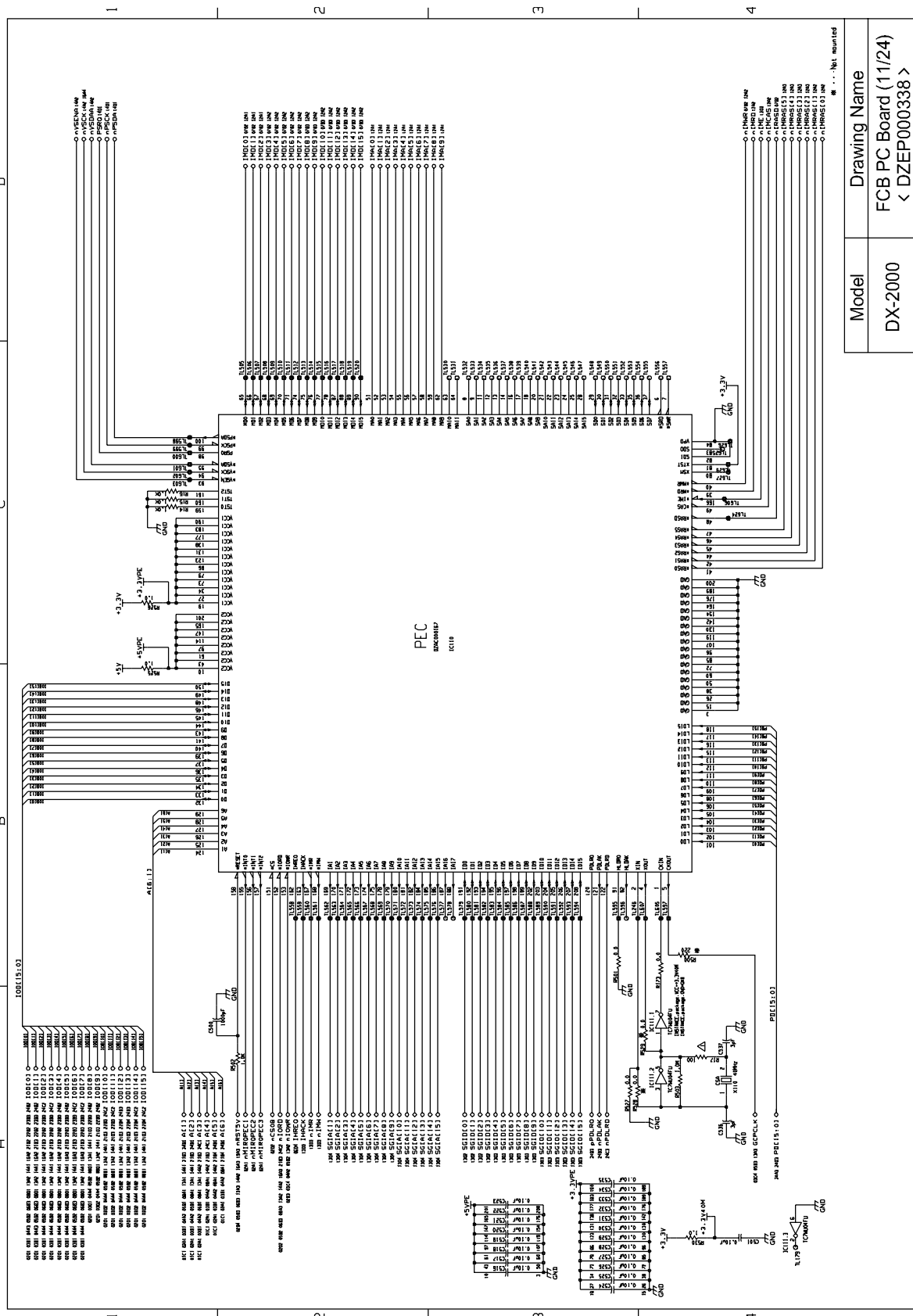
※ ... Not mounted



Model	Drawing Name
DX-2000	FCB PC Board (6/24) ζ DZFP000338 >

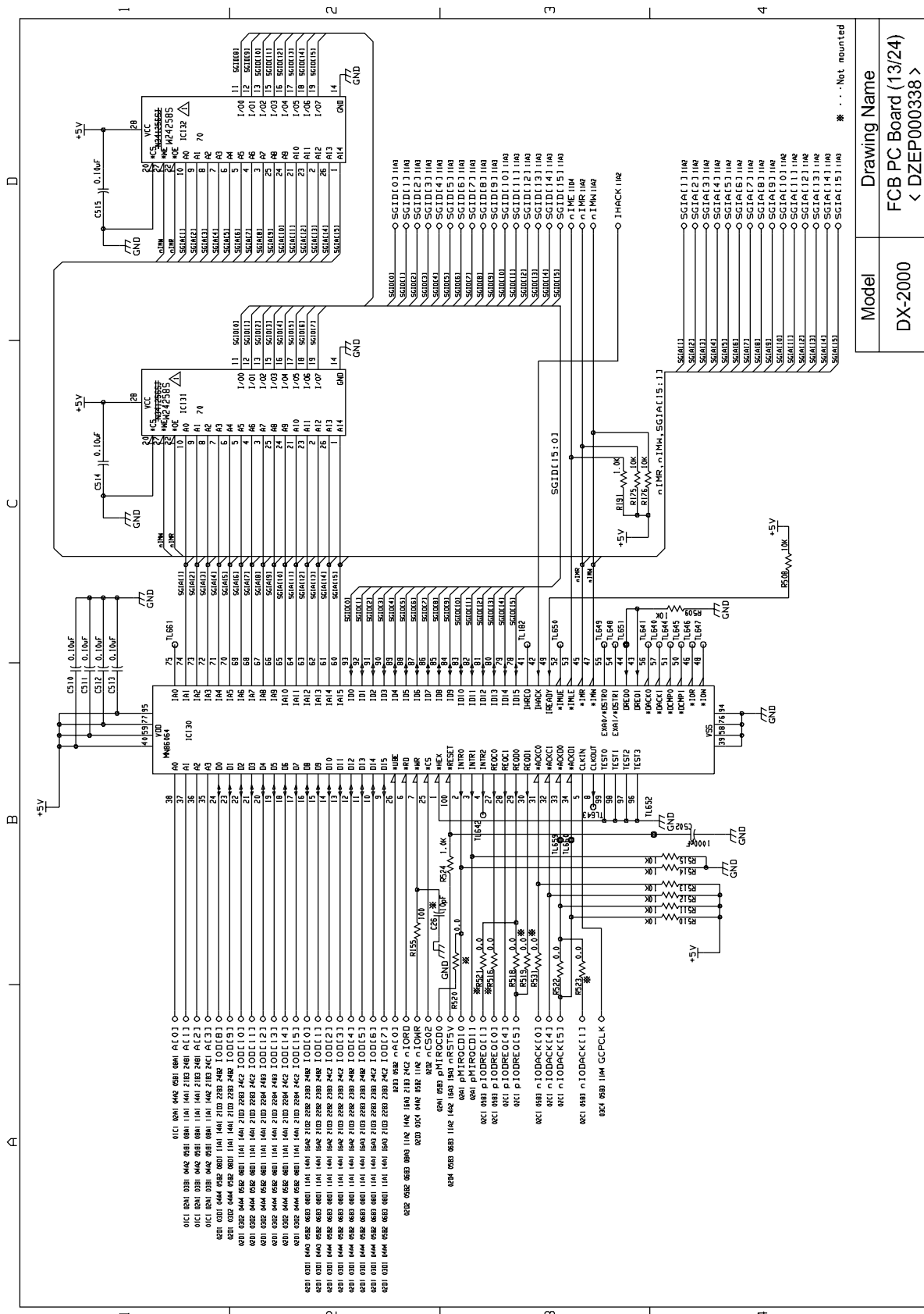


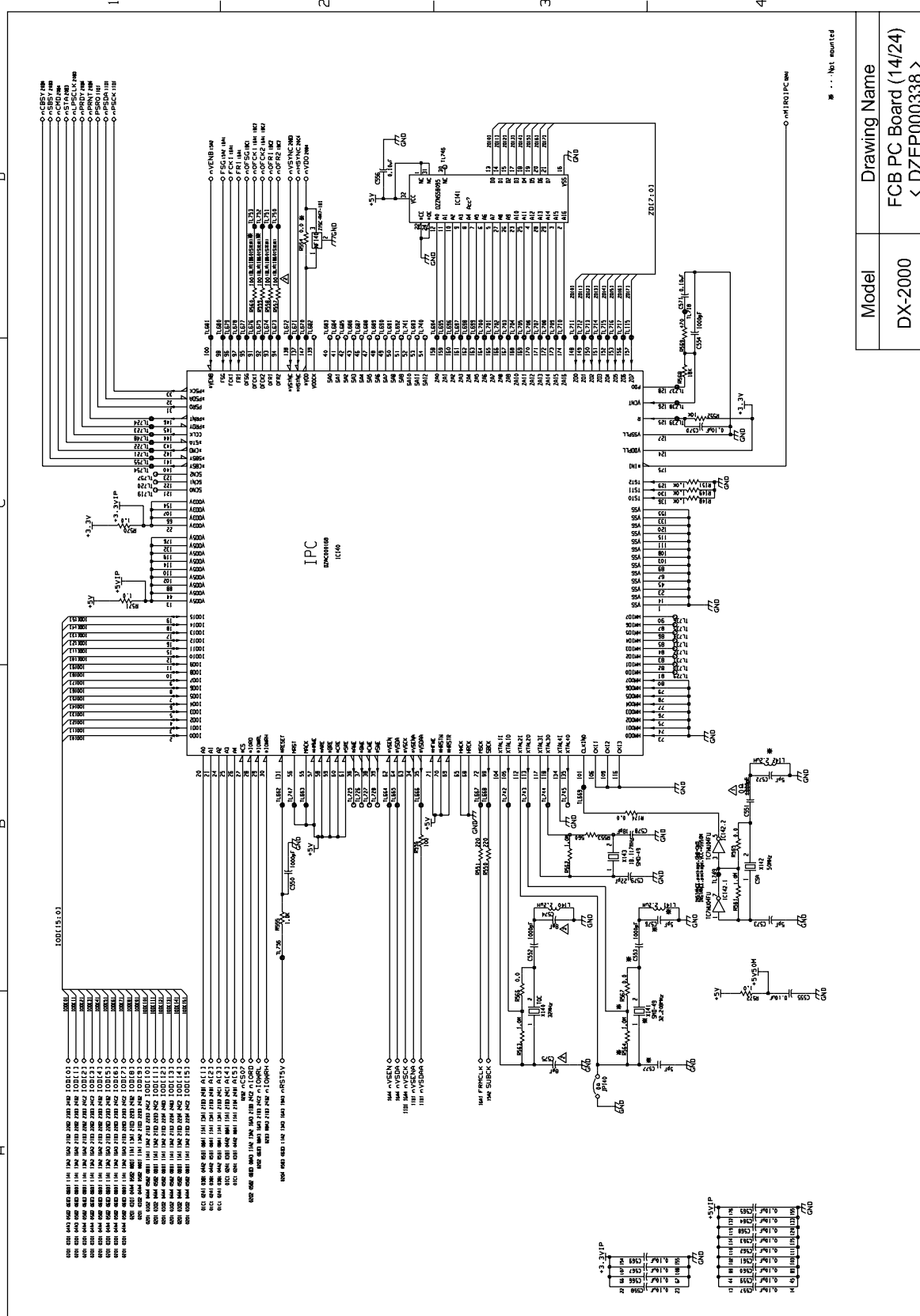
Model	Drawing Name
DX-2000	FCB PC Board (7/24) < DZEP000338 >



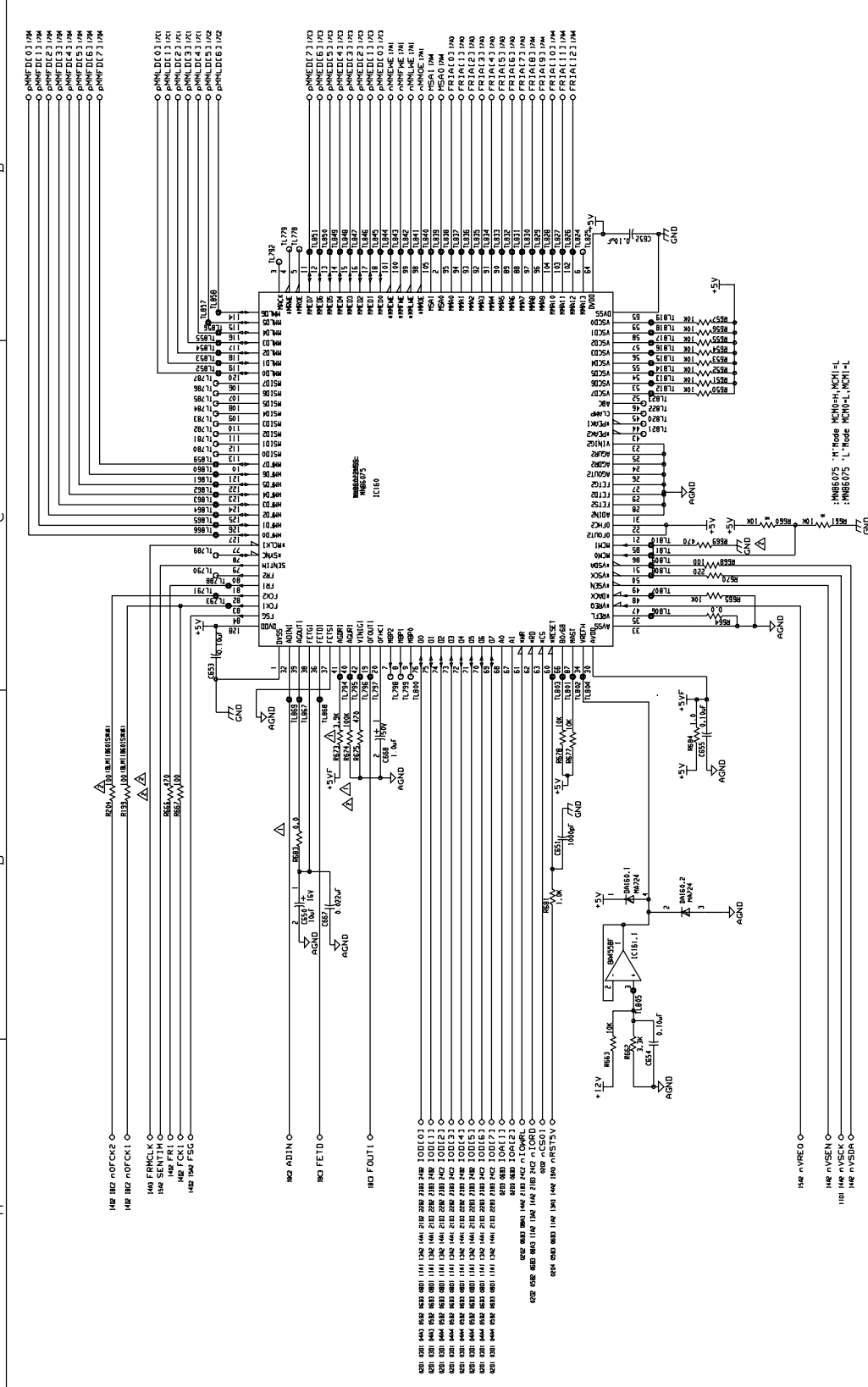
Model	Drawing Name
DX-2000	FCB PC Board (11/24)
	< DZEP000338 >





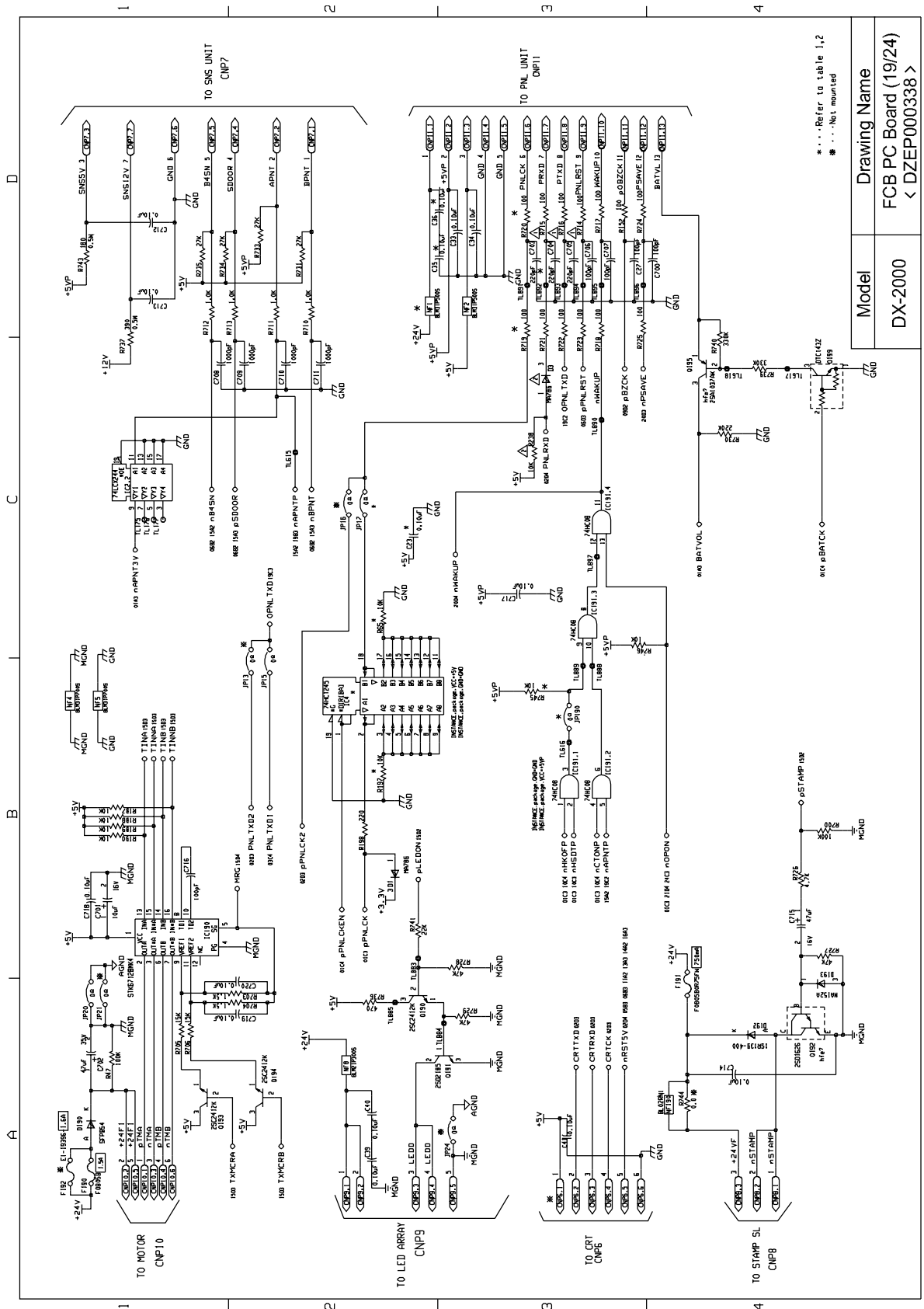


A B C D

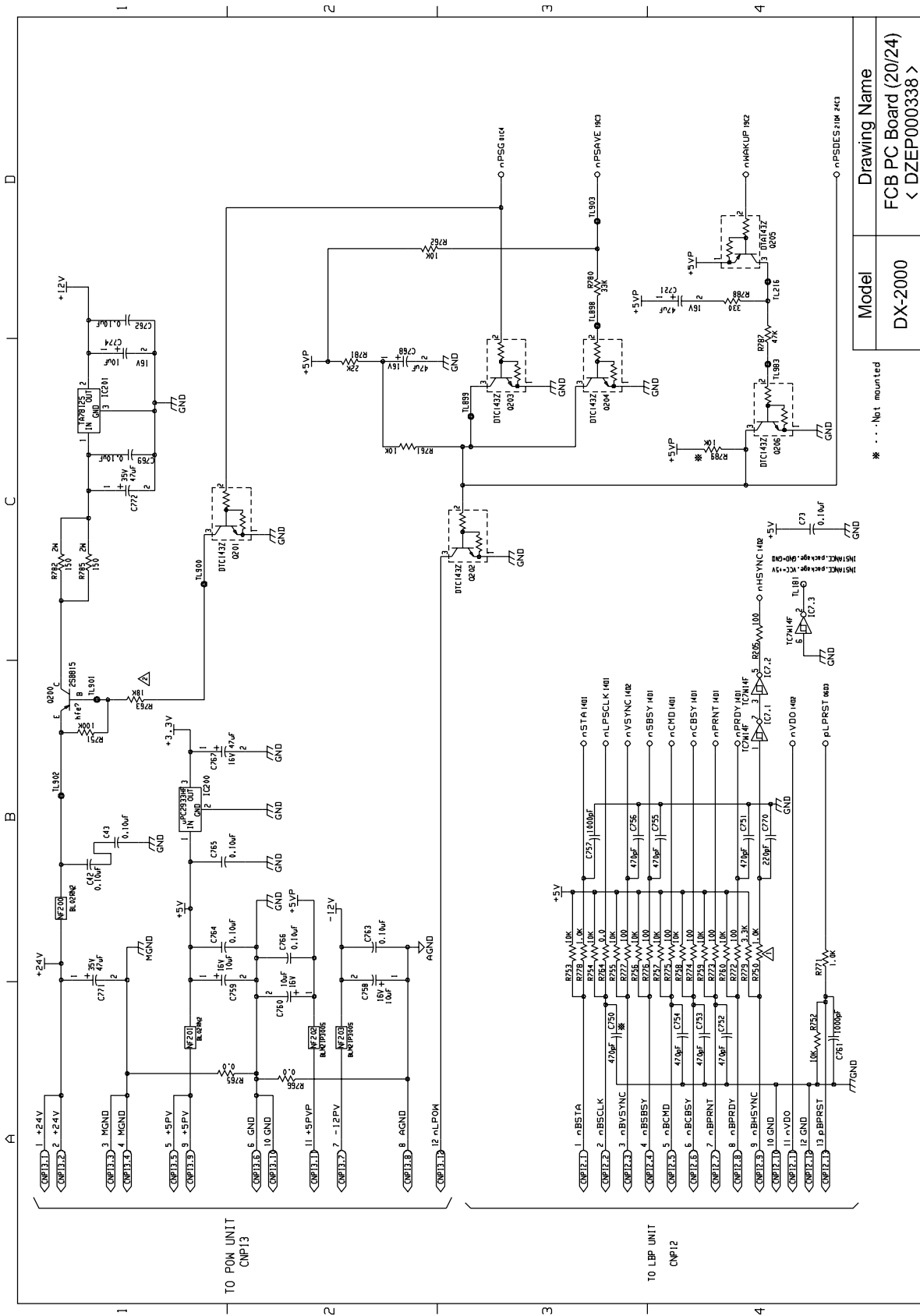


* ... Refer to table 1,2
* ... Not mounted

Model	Drawing Name
DX-2000	FCB PC Board (16/24) < DZEP000338 >

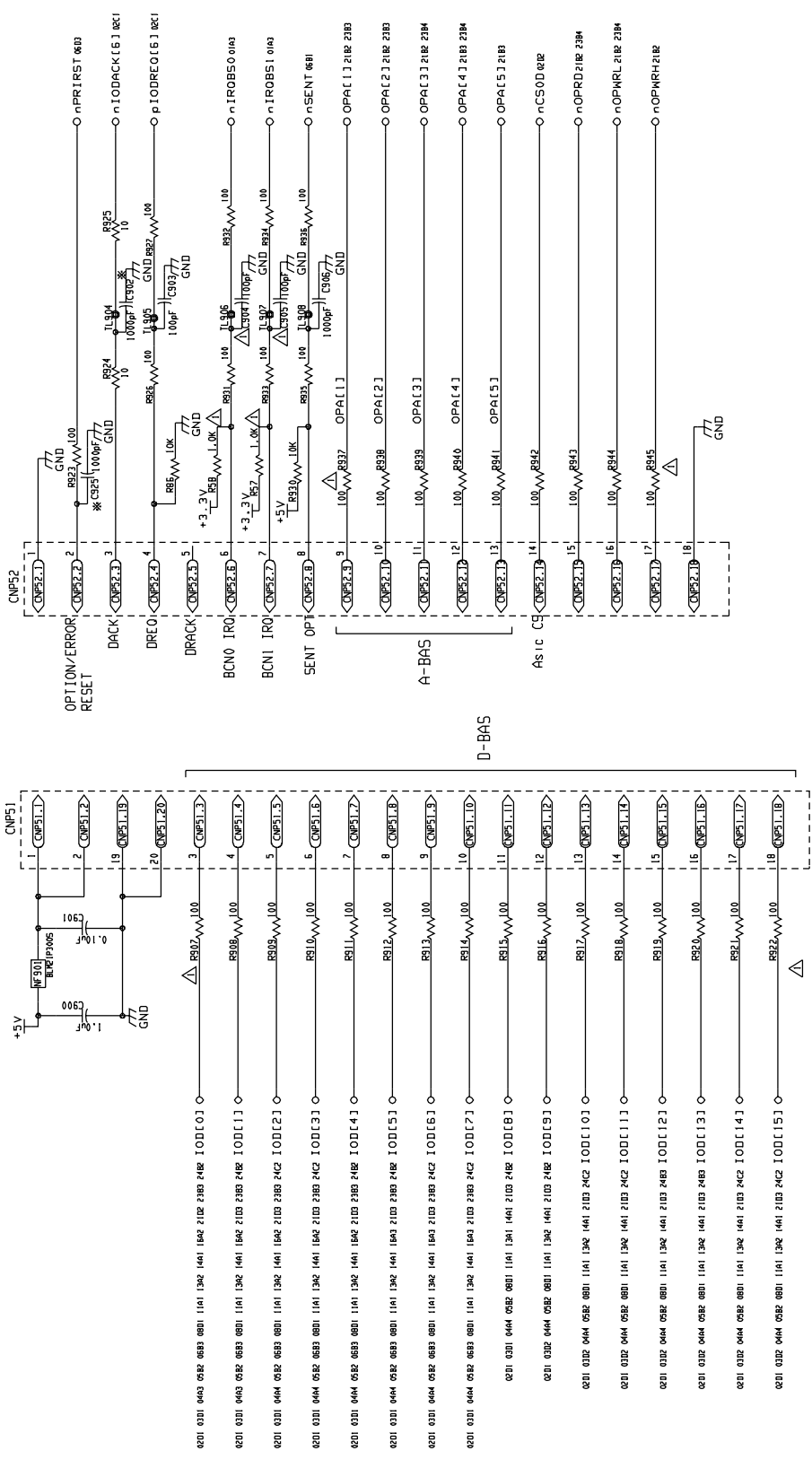


Model	Drawing Name
DX-2000	FCB PC Board (19/24) < DZEP000338 >



A B C D

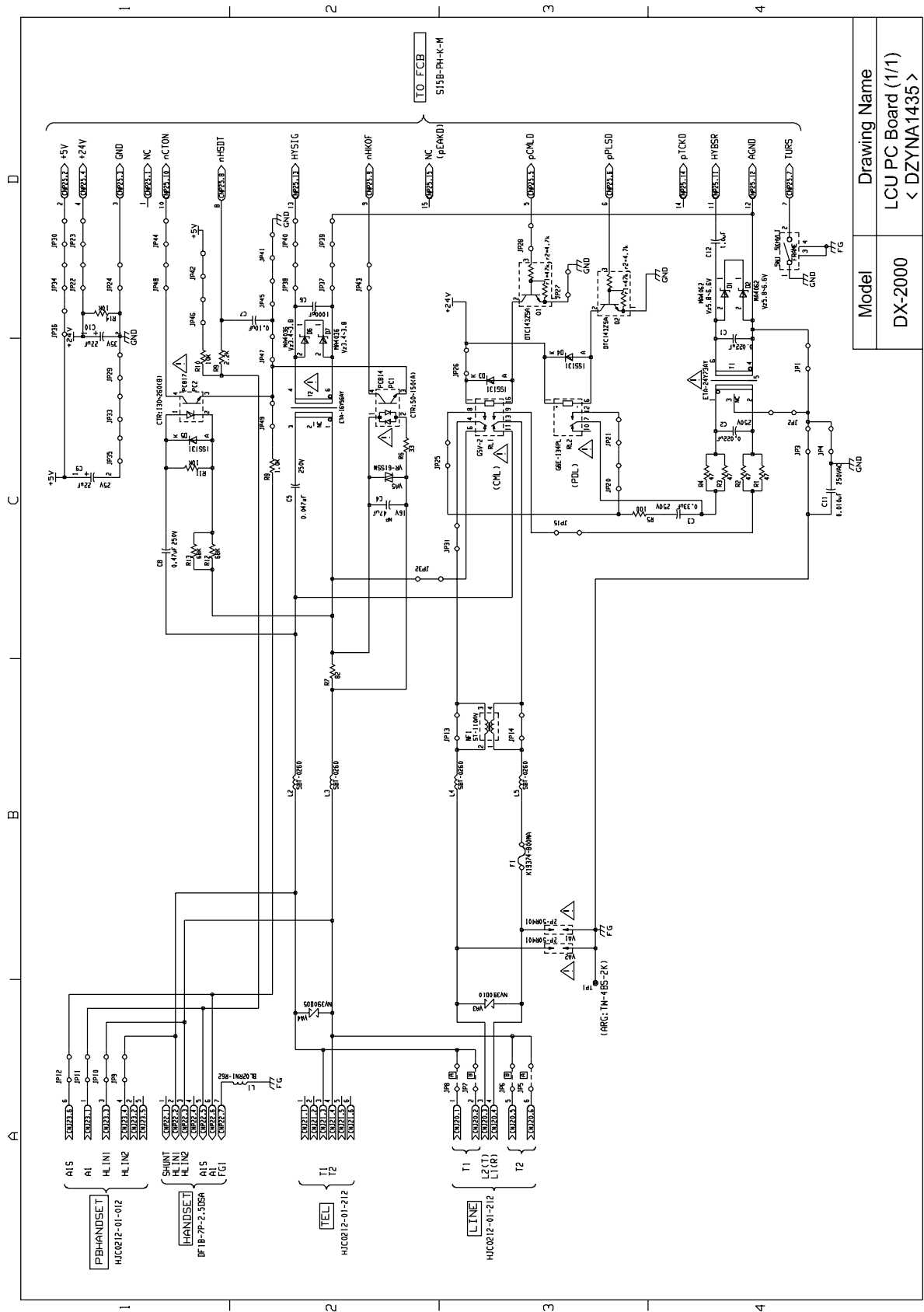
TO PR I/F Unit



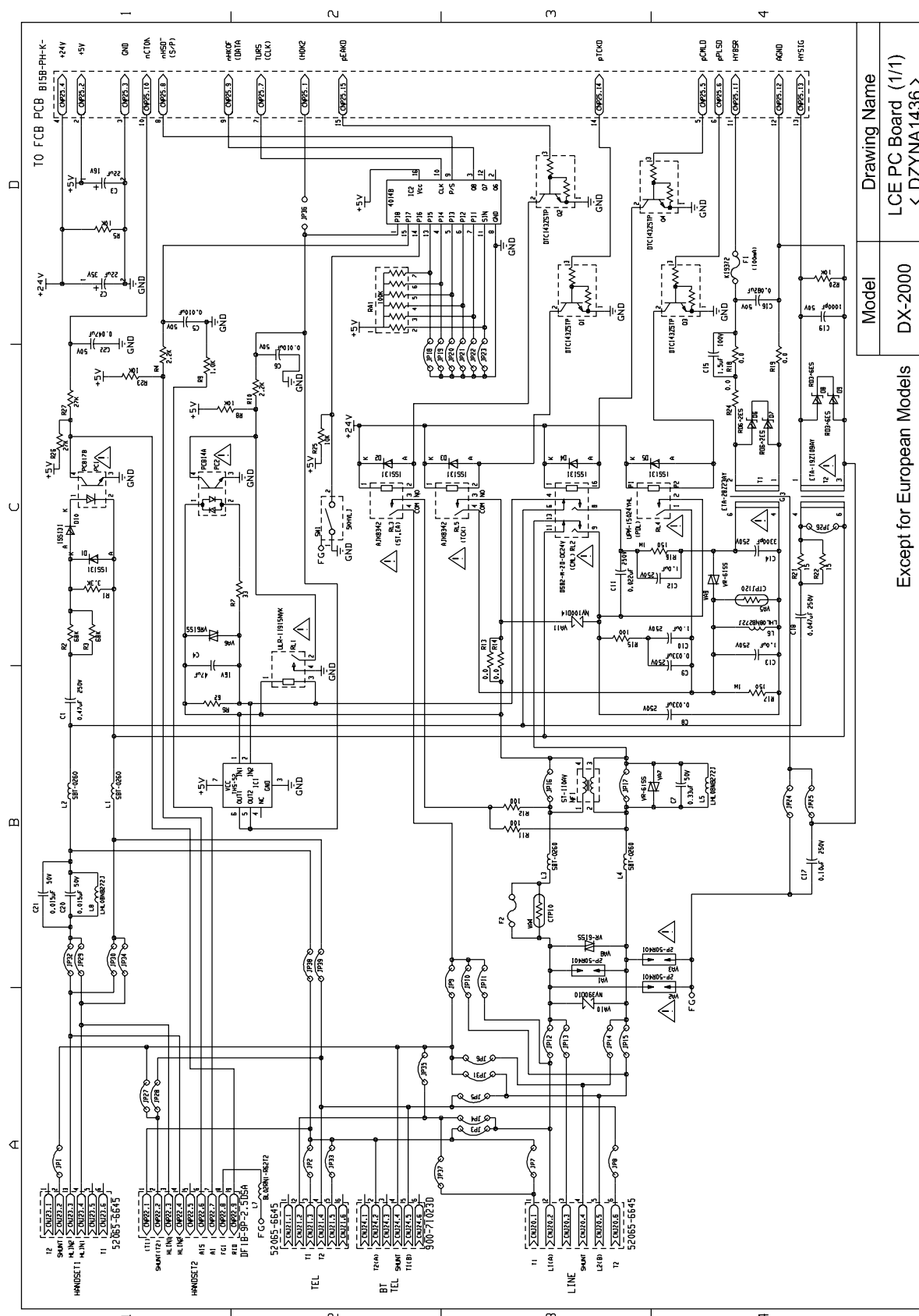
* ... Not mounted

Model	Drawing Name
DX-2000	FCB PC Board (22/24) < DZEP000338 >

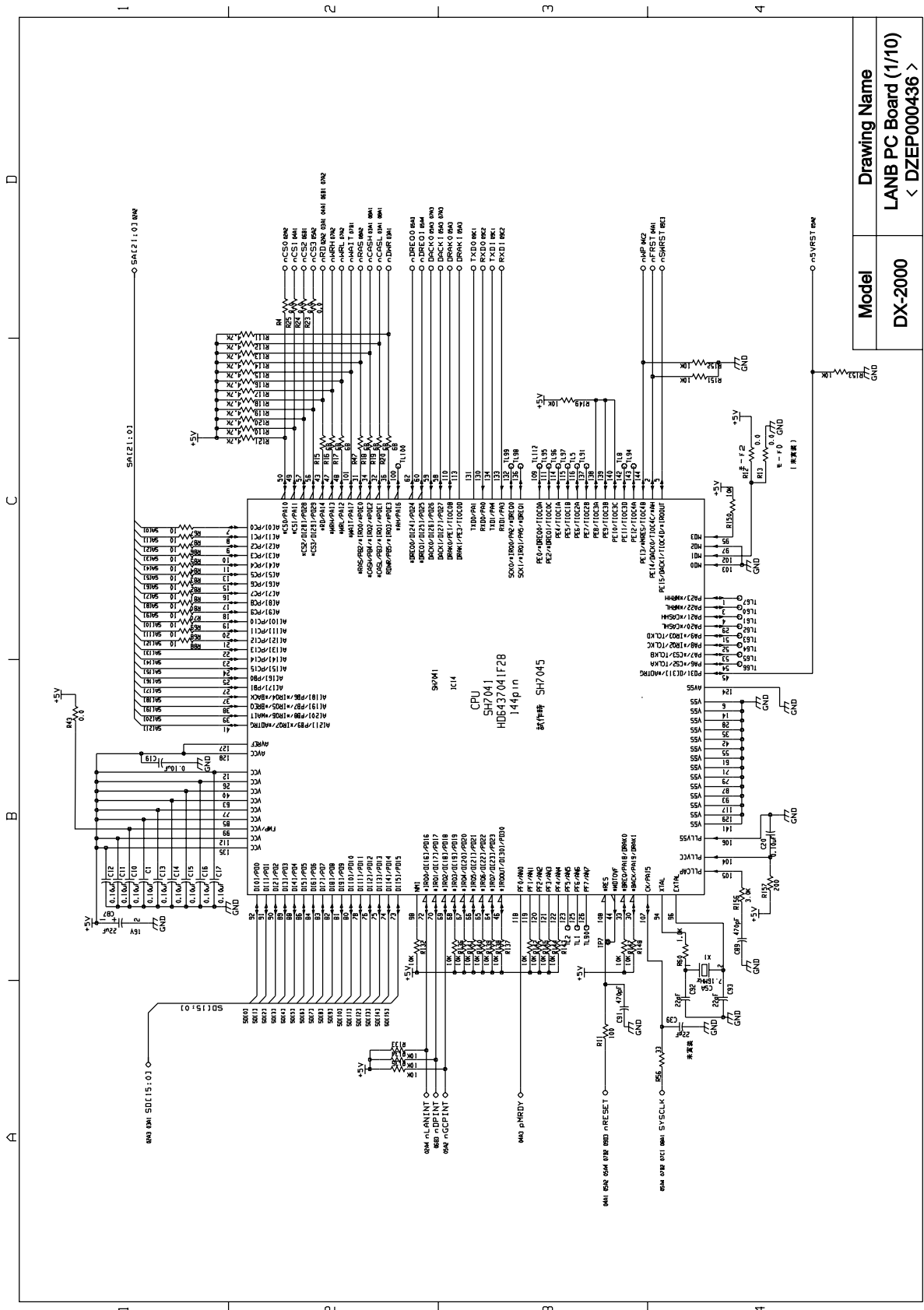
11.2. LCU PC Board

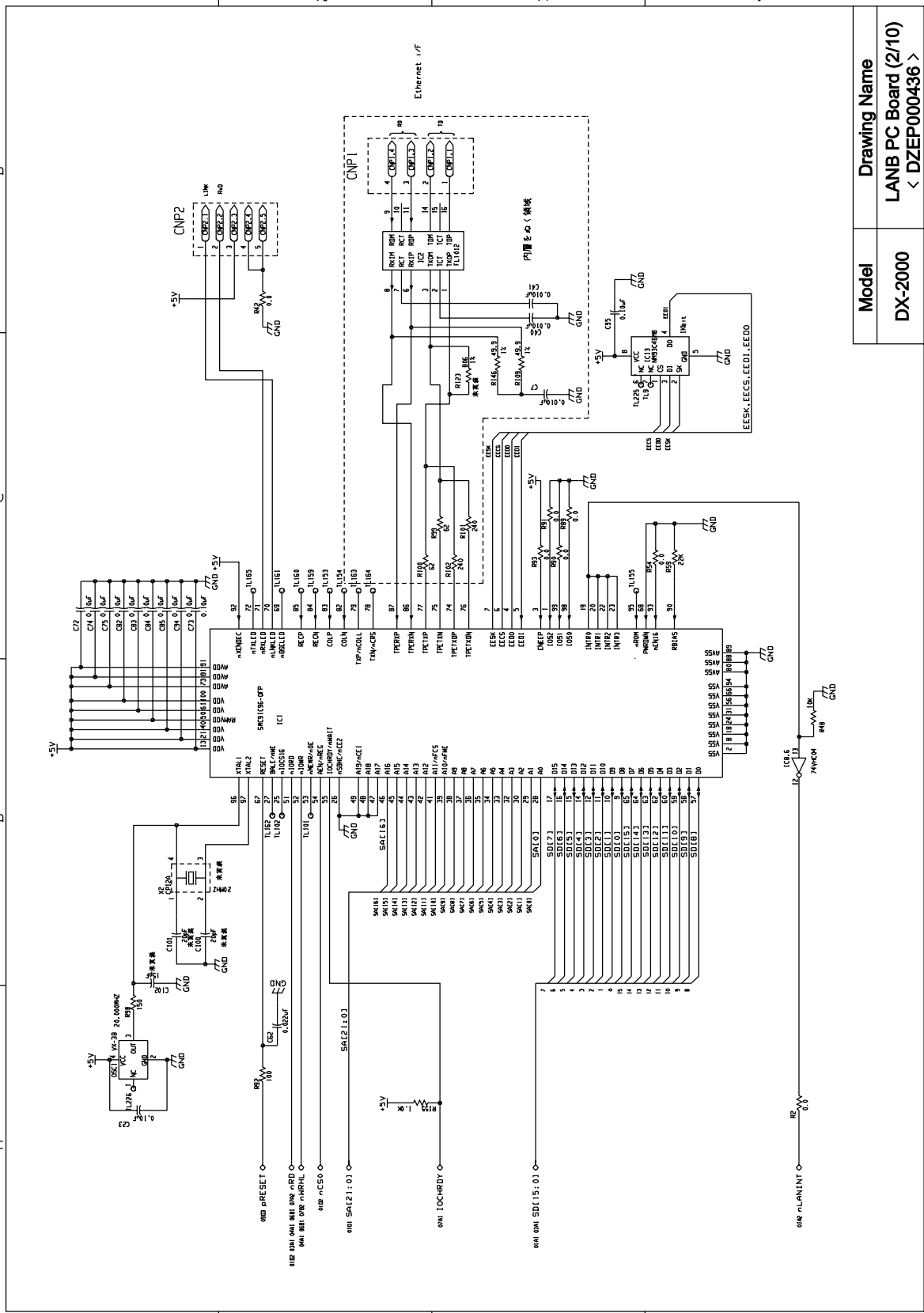


11.3. LCE PC Board

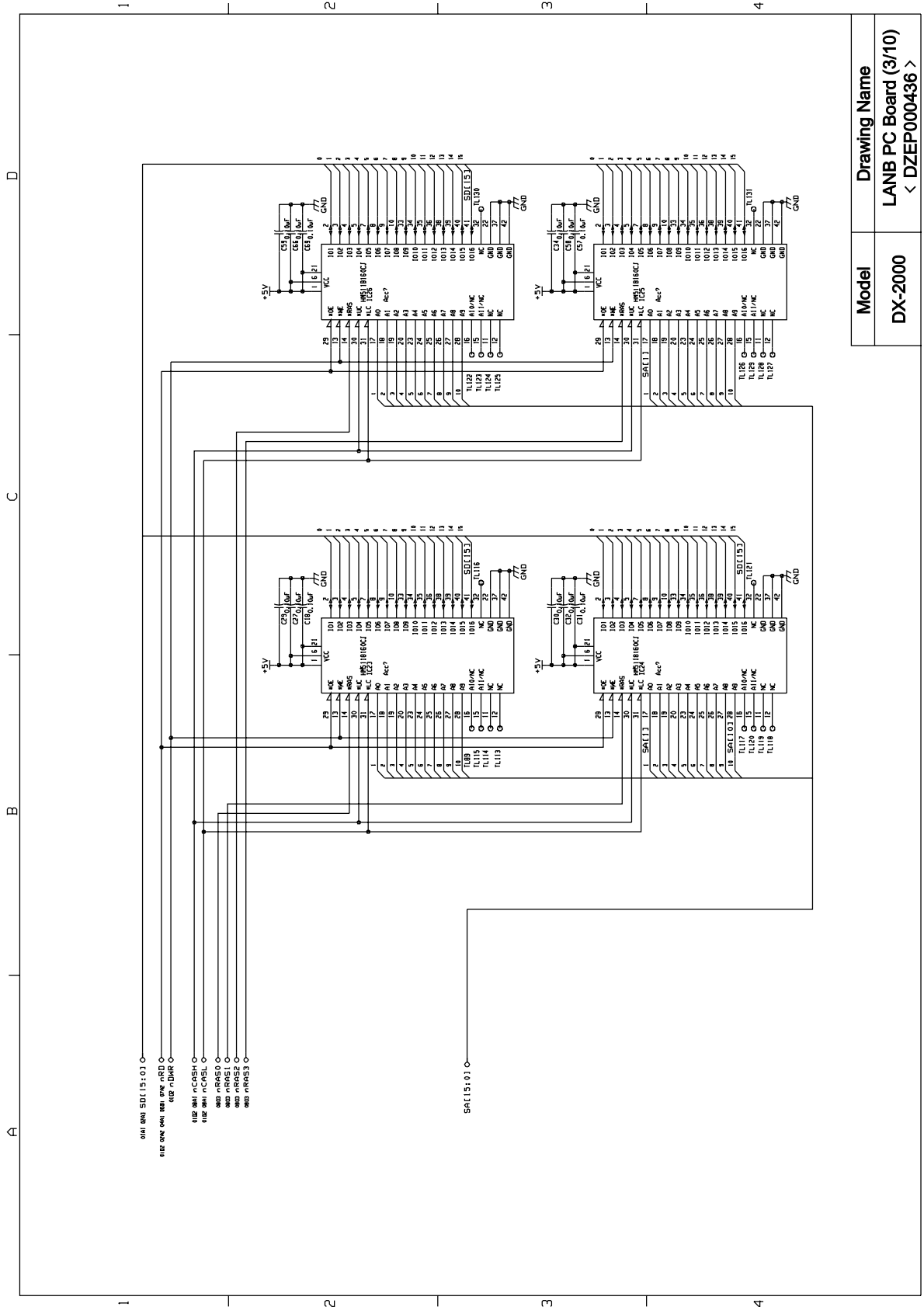


11.4. LANB PC Board

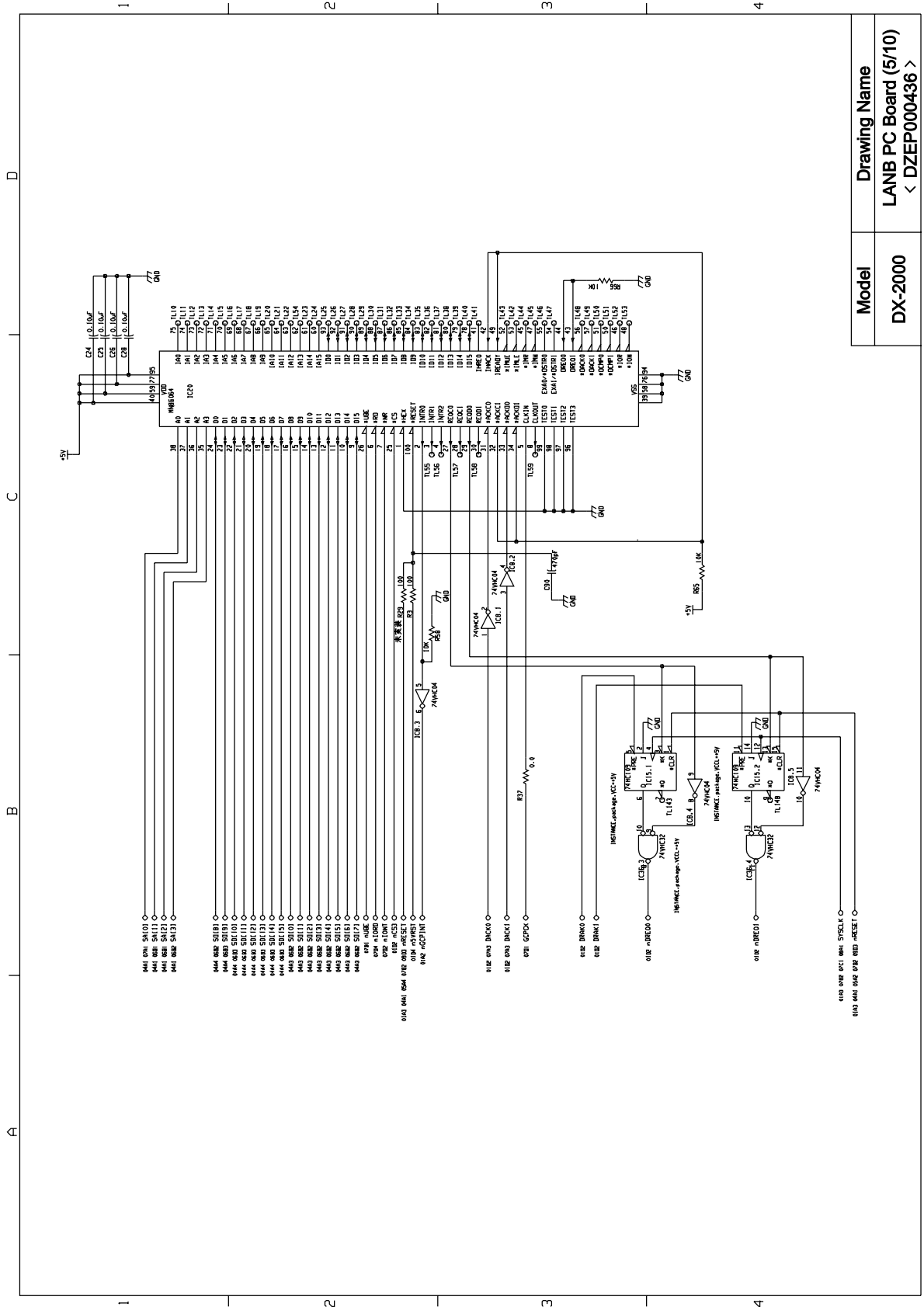




Model	Drawing Name
DX-2000	LANB PC Board (2/10) < DZEP000436 >

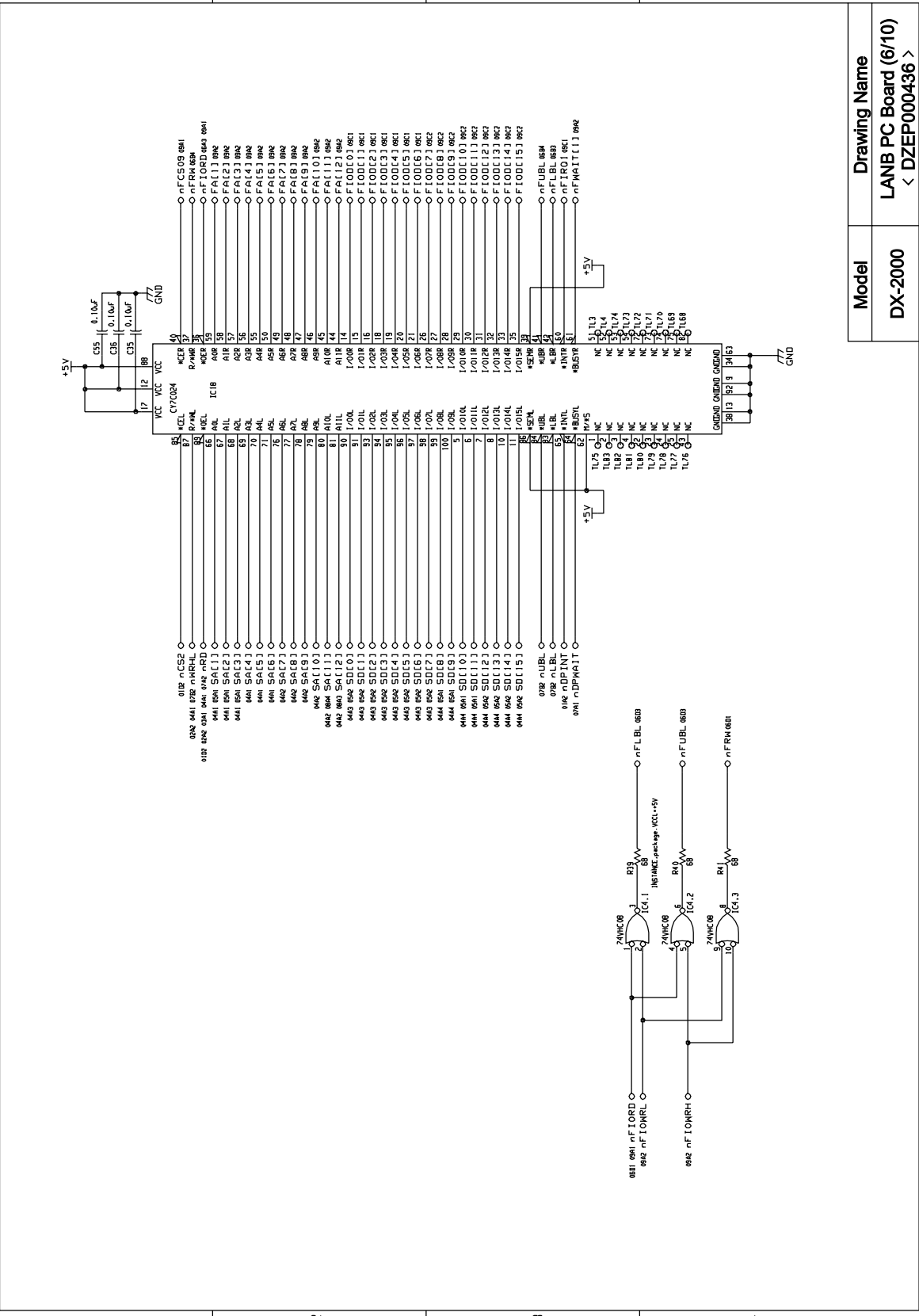


Model	Drawing Name
DX-2000	LANB PC Board (3/10) < DZEP000436 >



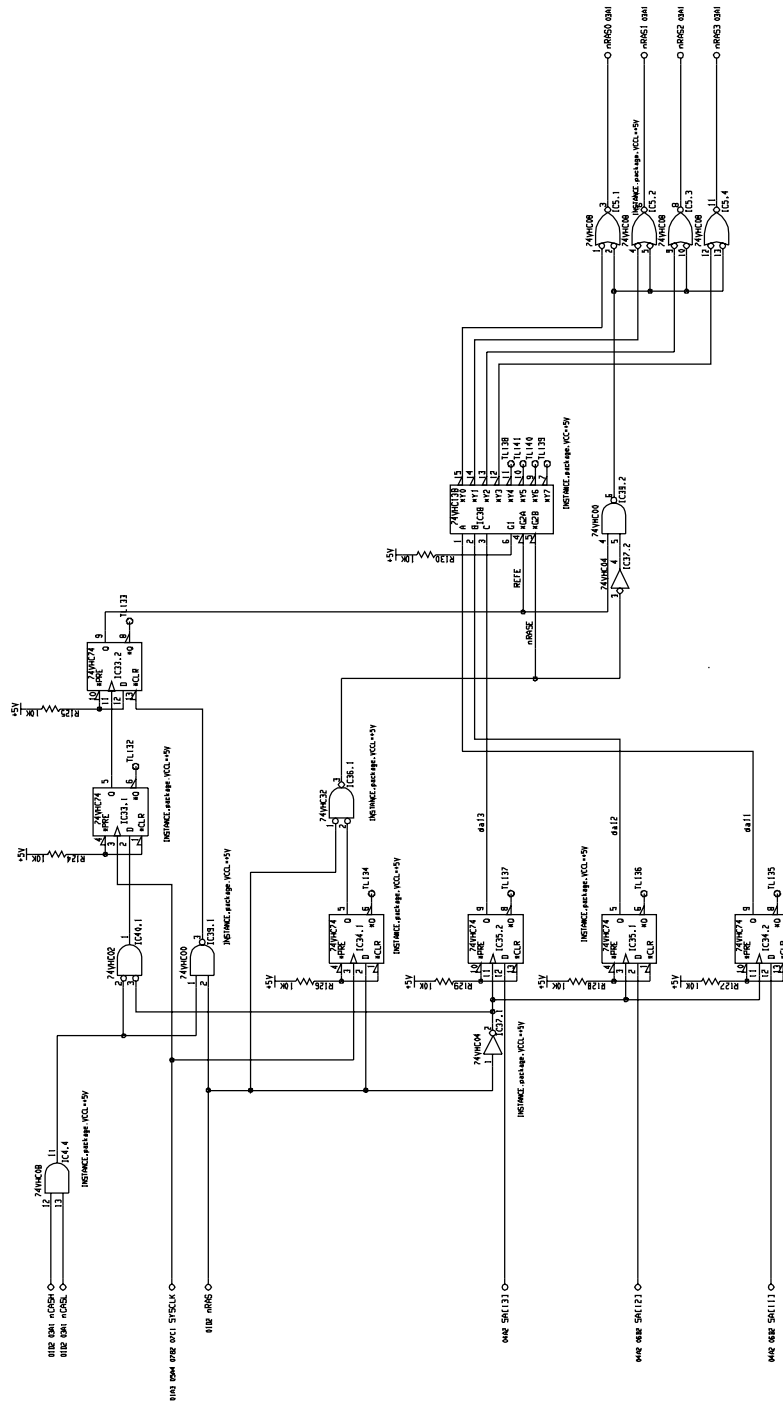
Model	Drawing Name
DX-2000	LANB PC Board (5/10) < DZEP000436 >

A B C D



Model	Drawing Name
DX-2000	LANB PC Board (6/10) < DZEP000436 >

A B C D

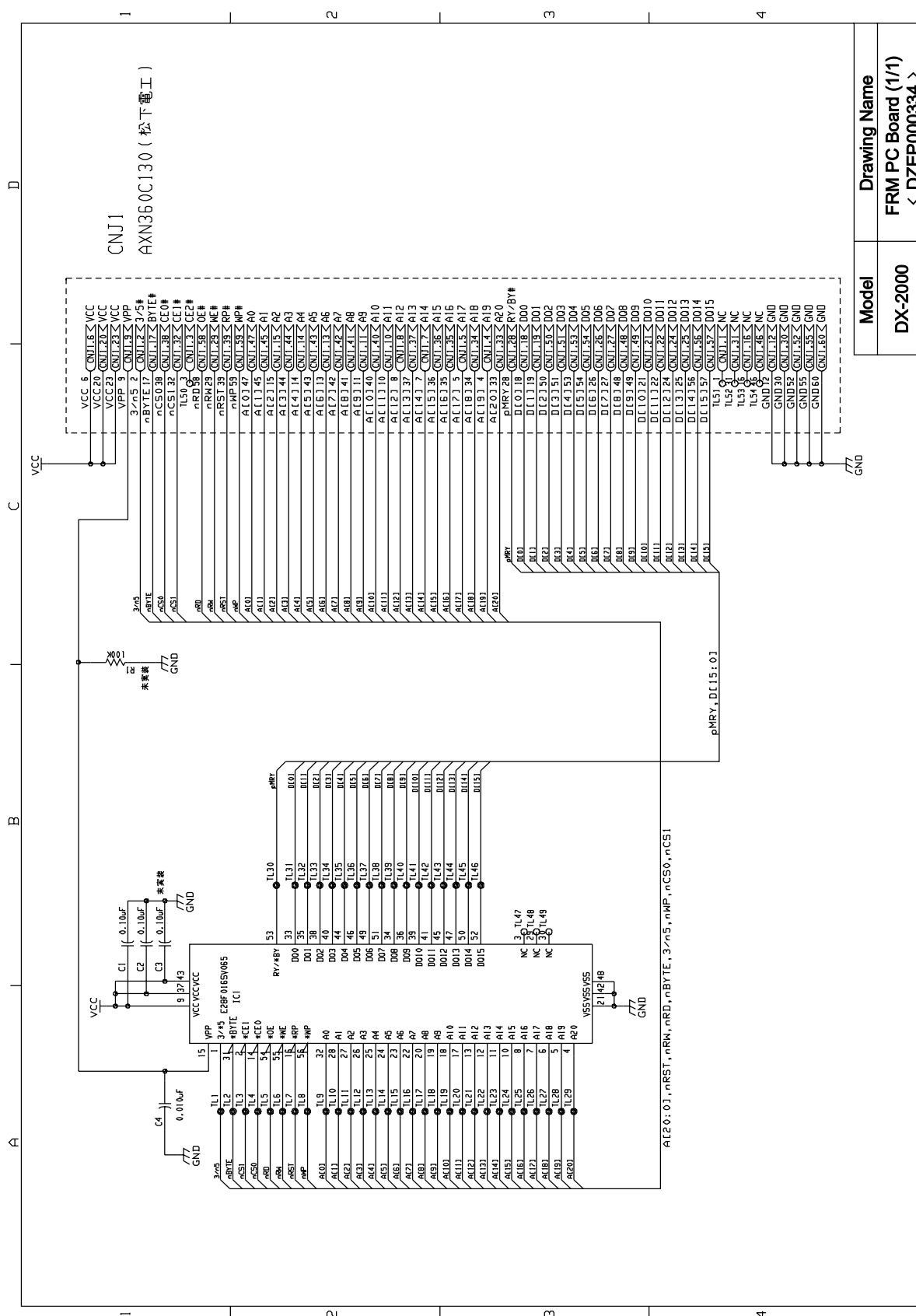


Model	Drawing Name
DX-2000	LANB PC Board (8/10) < DZEP000436 >

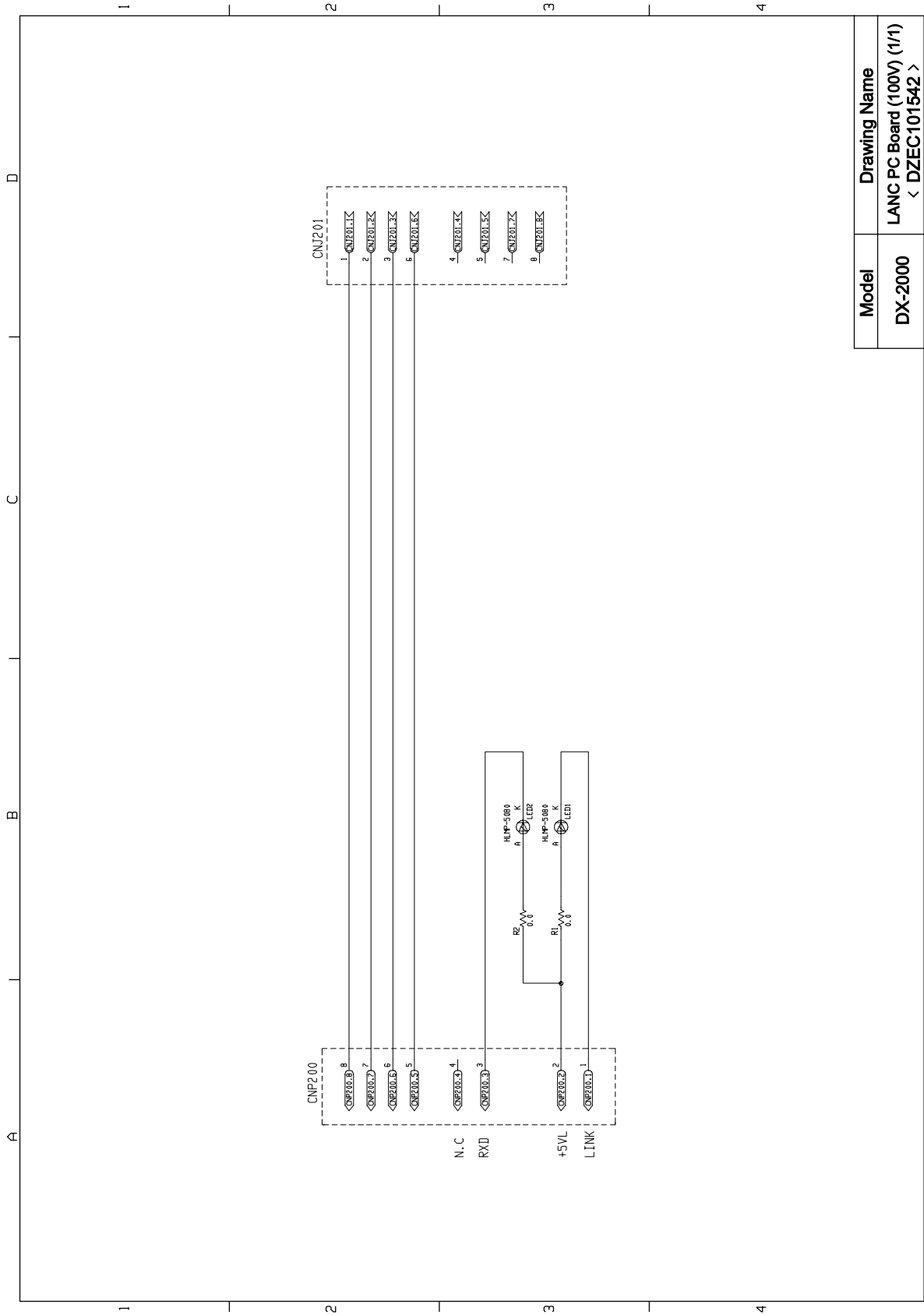
A			B			C			D							
PAGE	REV.No.	Qty	CONTENTS	T/I No.	DATE	REV.BY	APP.BY	PAGE	REV.No.	Qty	CONTENTS	T/I No.	DATE	REV.BY	APP.BY	
1																
2																
3																
4																

												Model	Drawing Name			
												DX-2000	LANB PC Board (10/10) < DZEP000436 >			

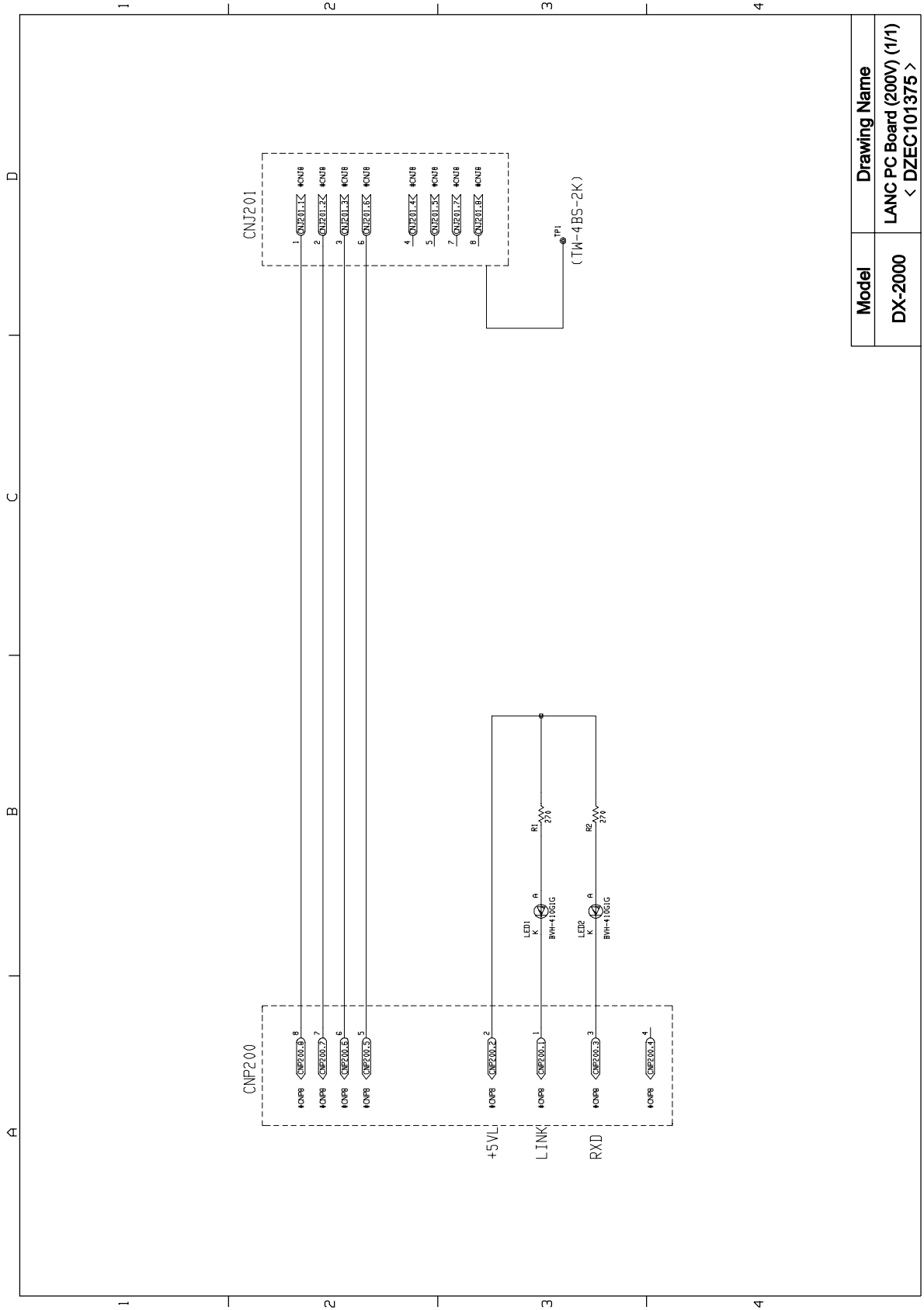
11.5. FRM PC Board



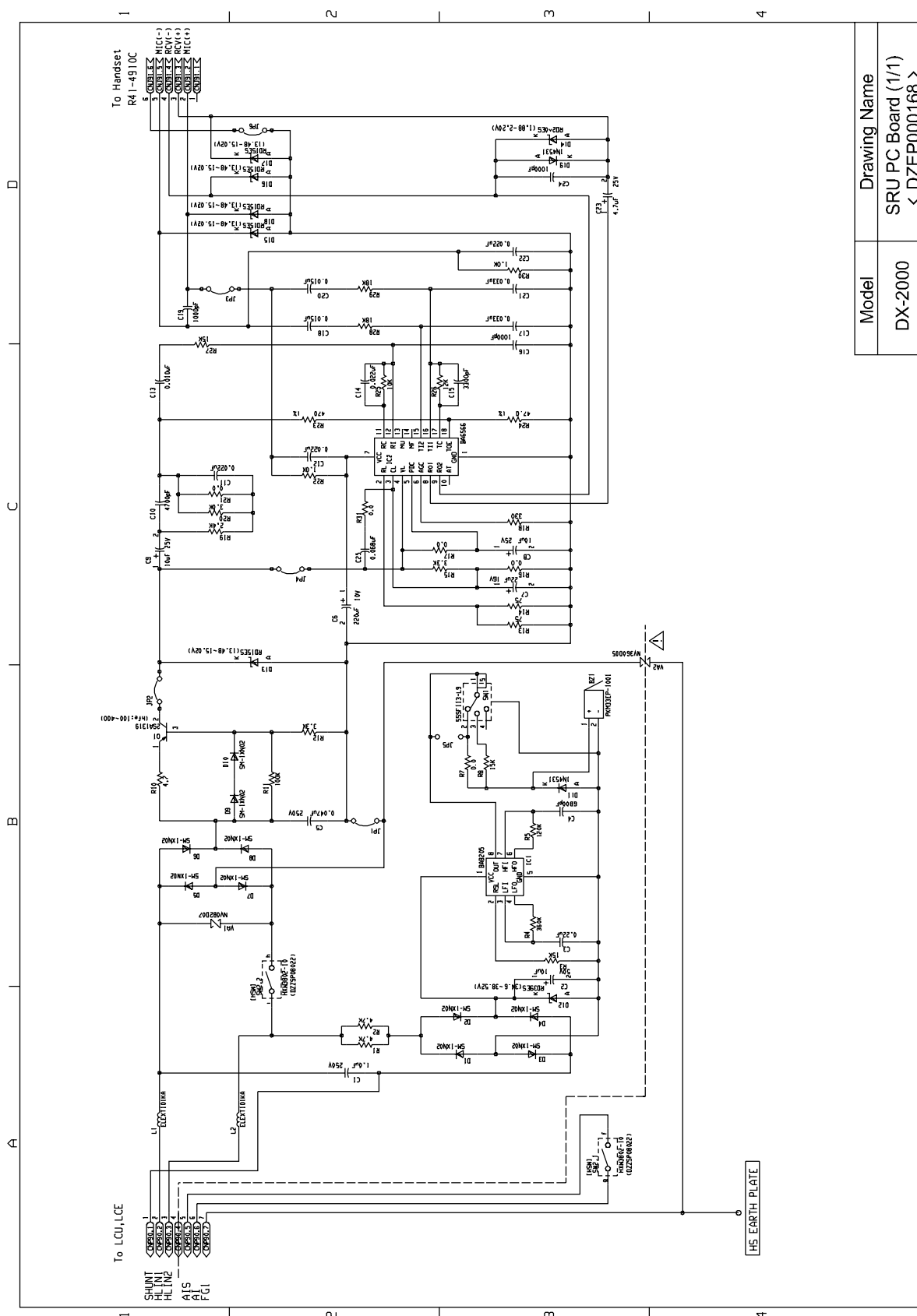
11.6. LANC PC Board



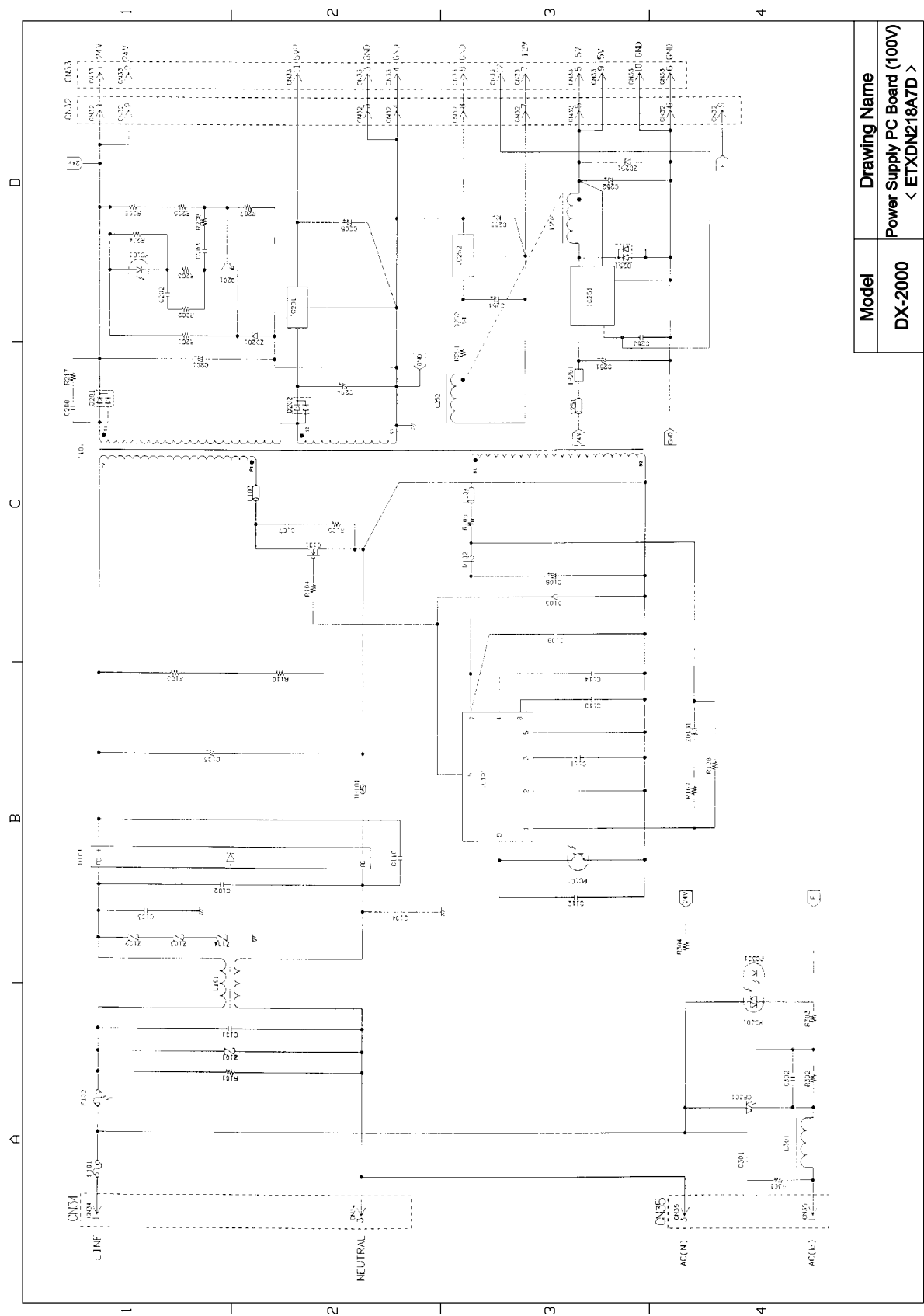
Model	Drawing Name
DX-2000	LANC PC Board (100V) (1/1) < DZEC101542 >



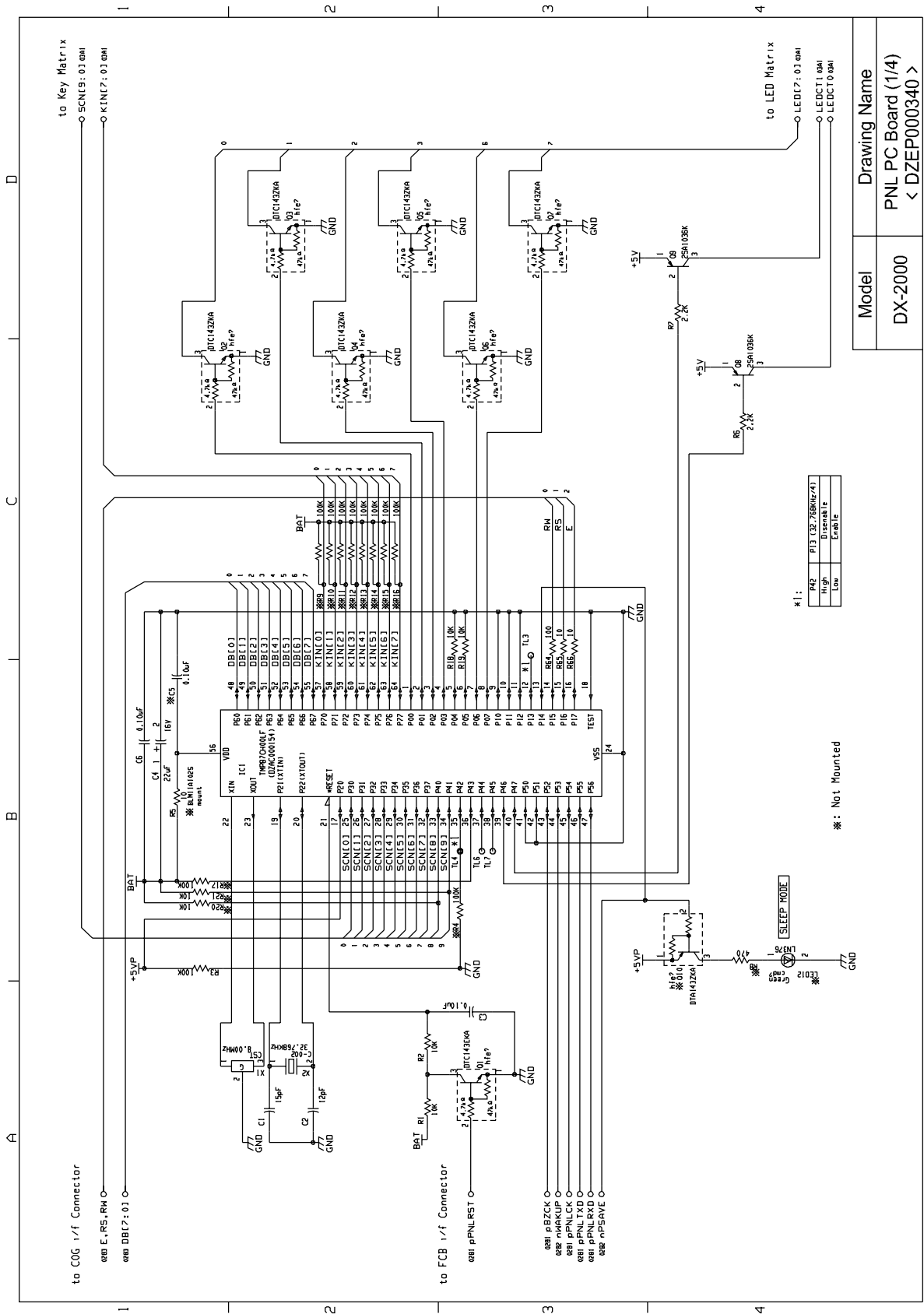
11.7. SRU PC Board

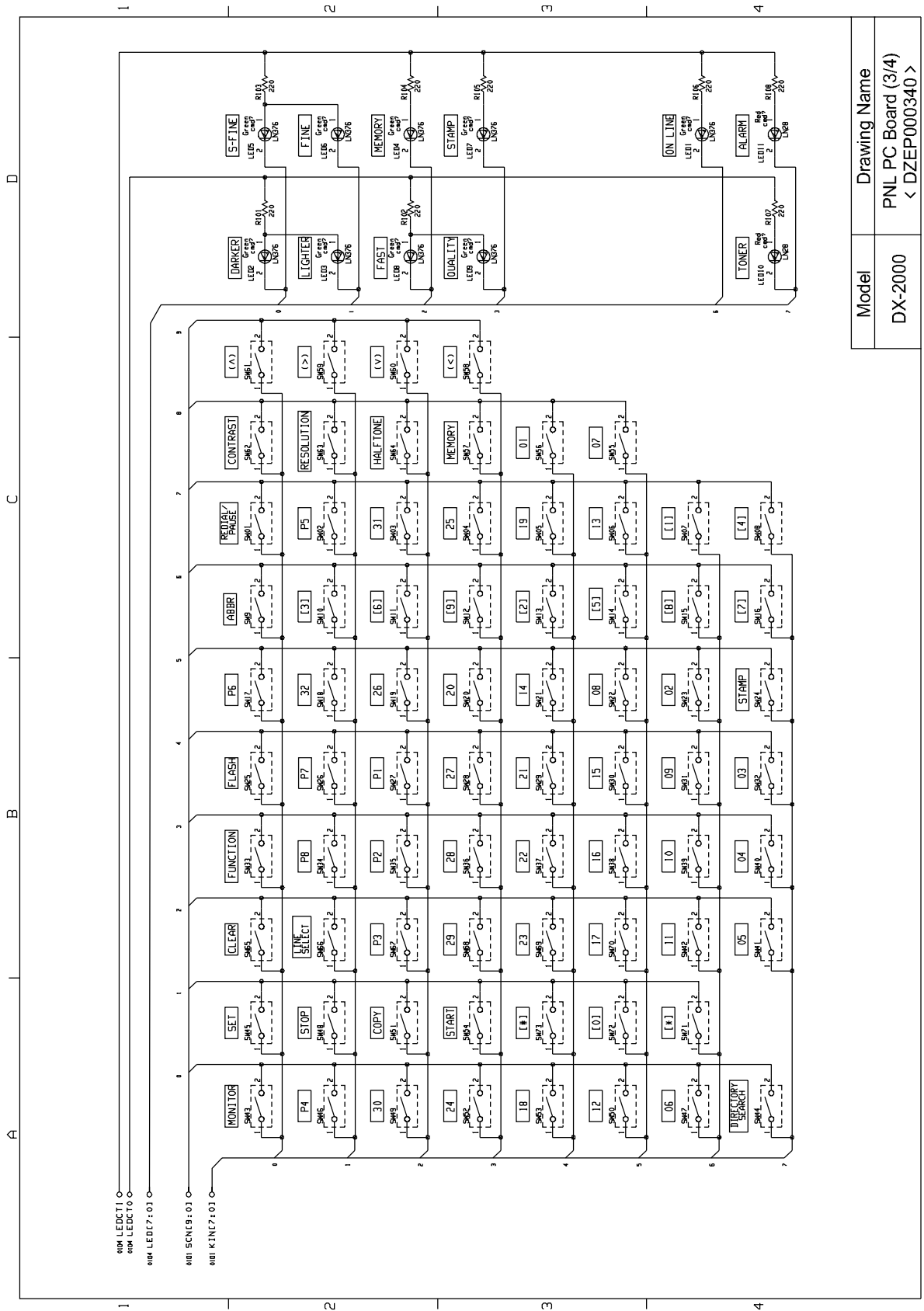


11.8. Low Voltage Power Supply PC Board

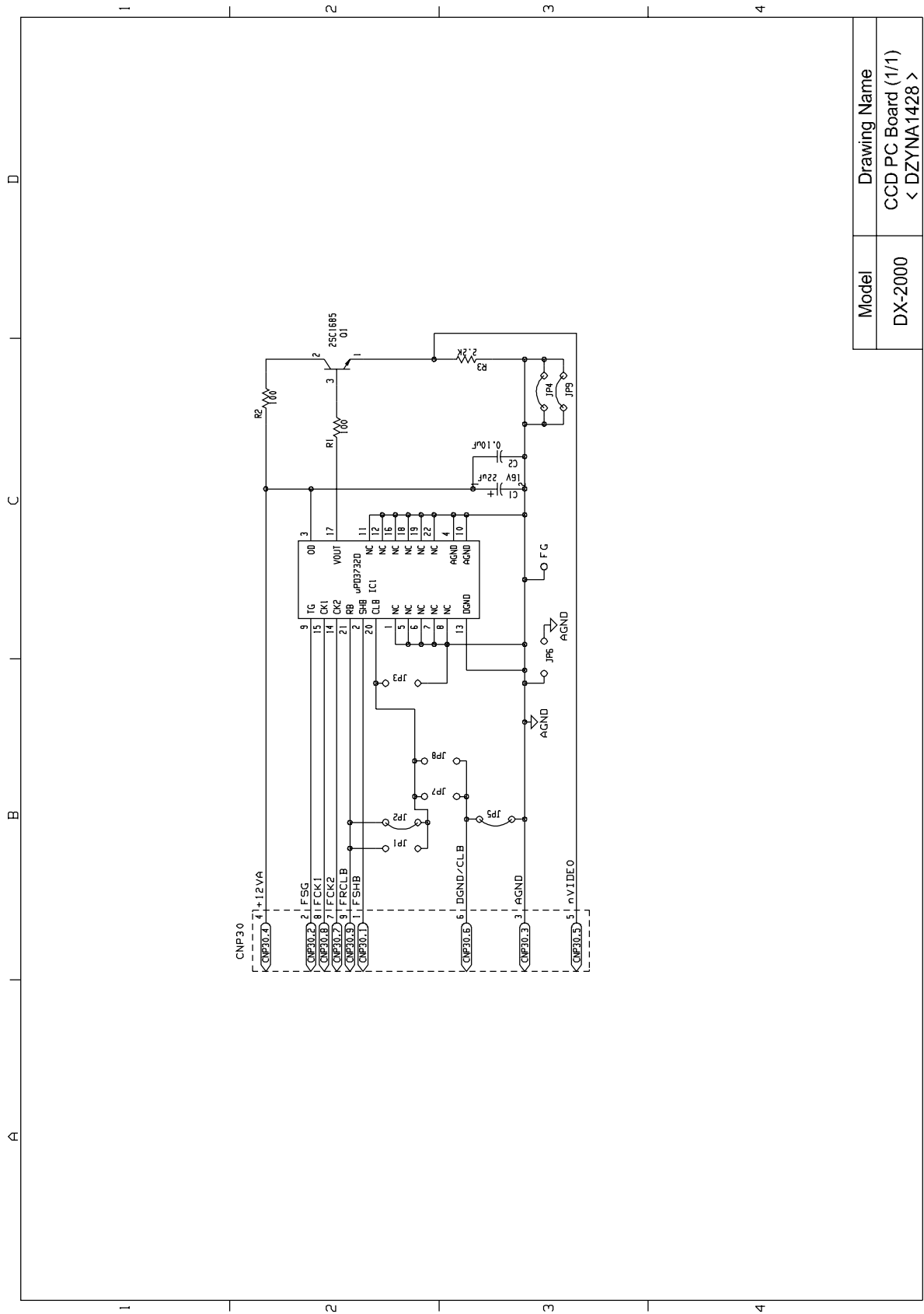


11.9. PNL PC Board

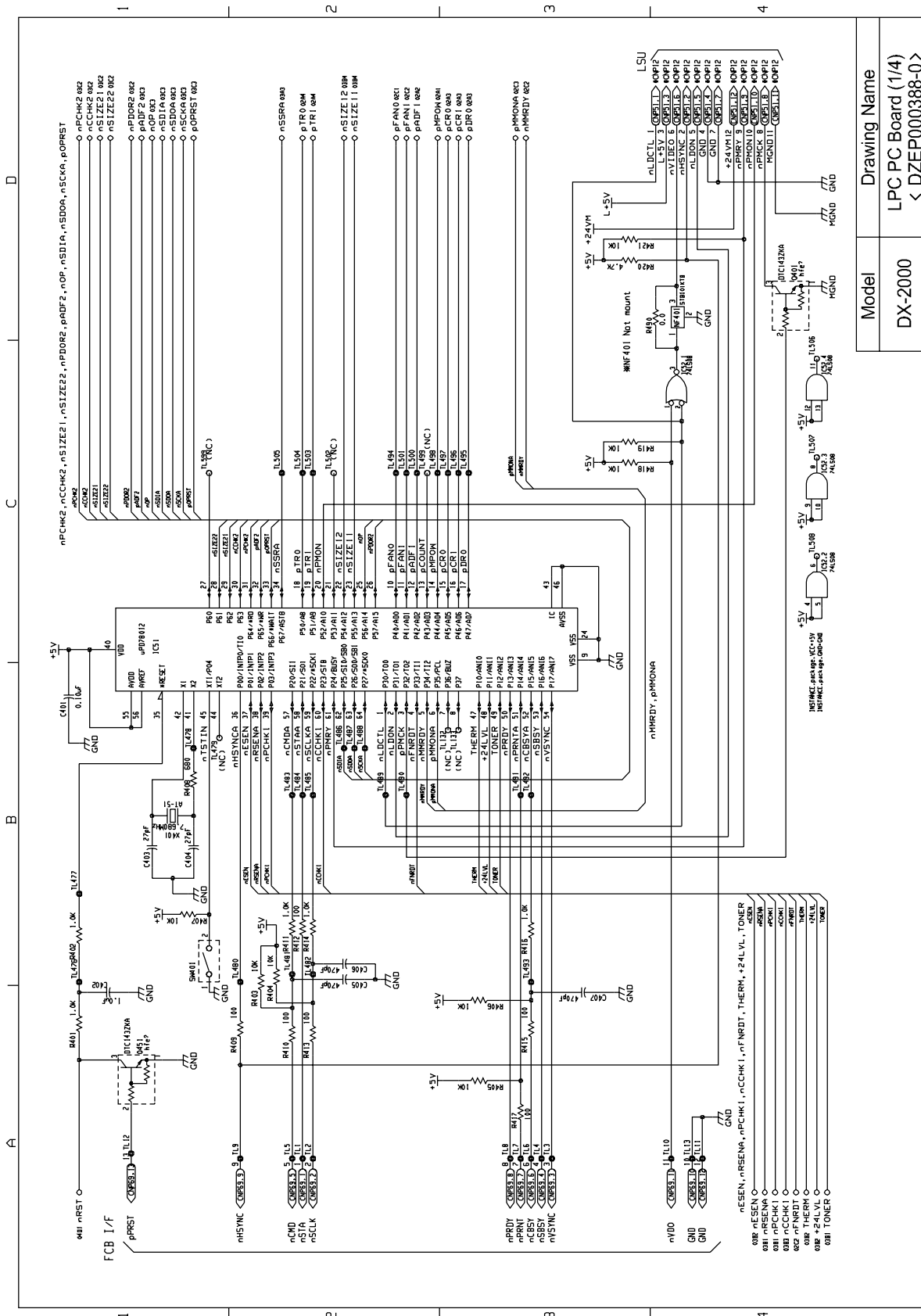


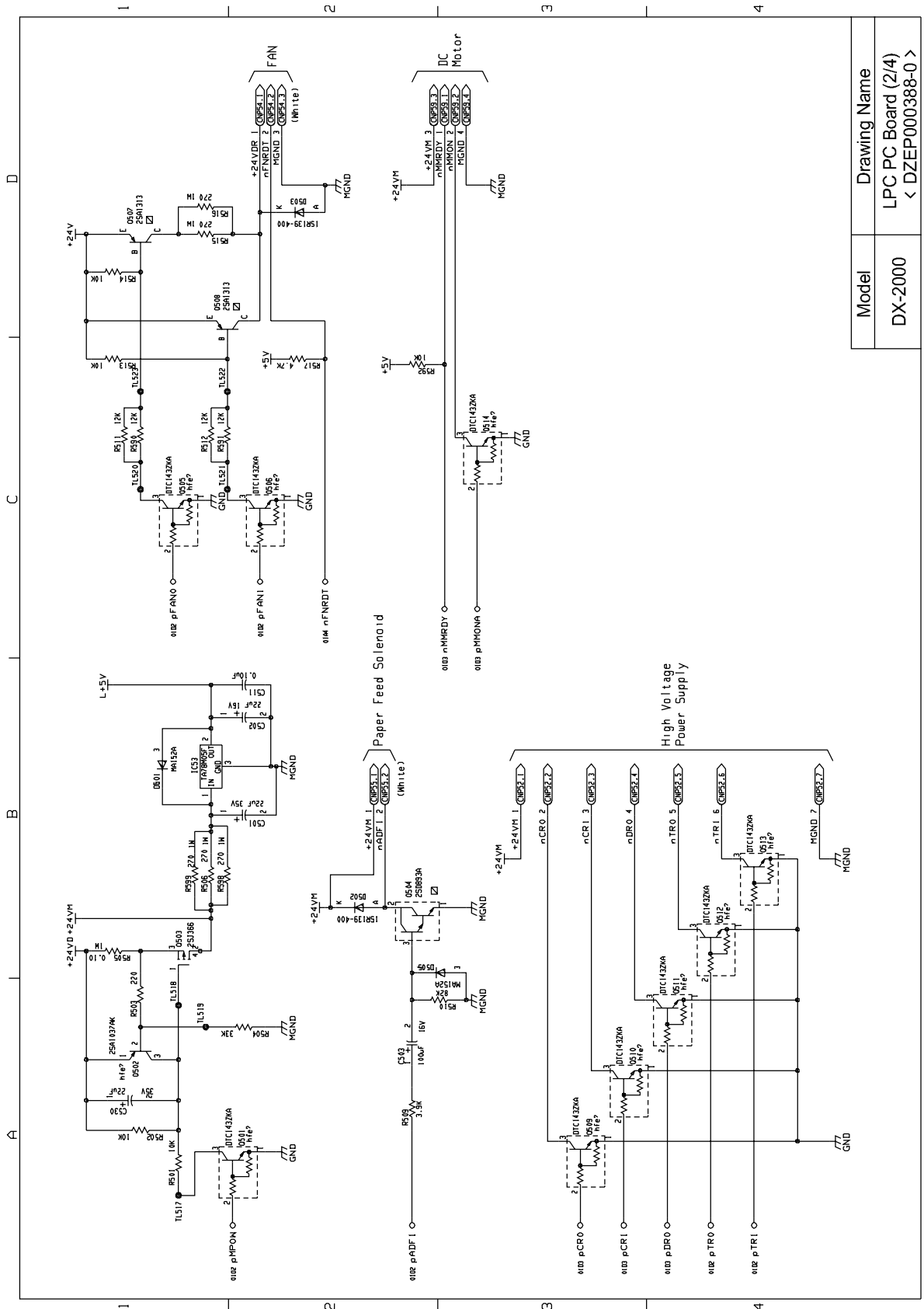


11.10. CCD PC Board

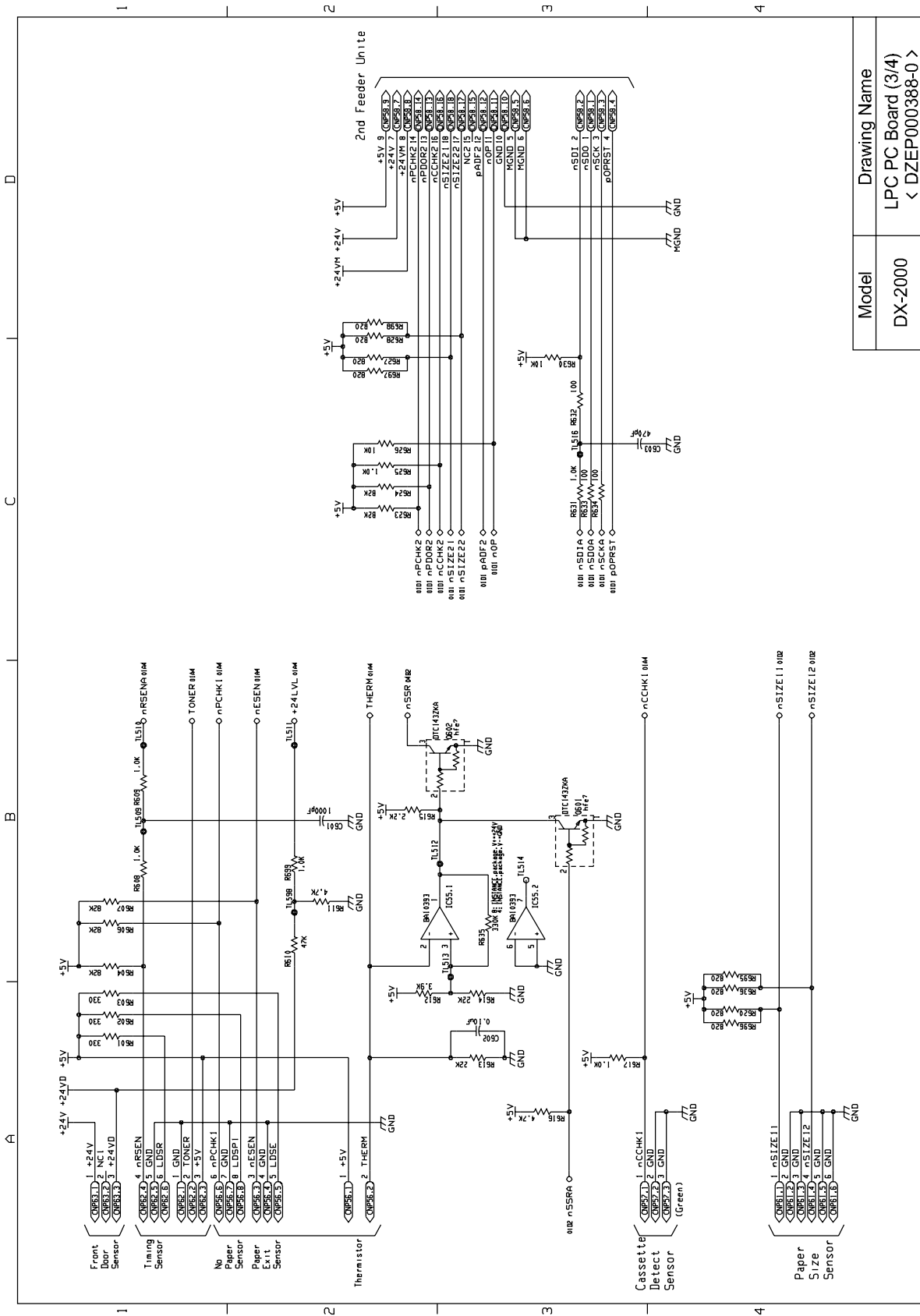


11.11. LPC PC Board

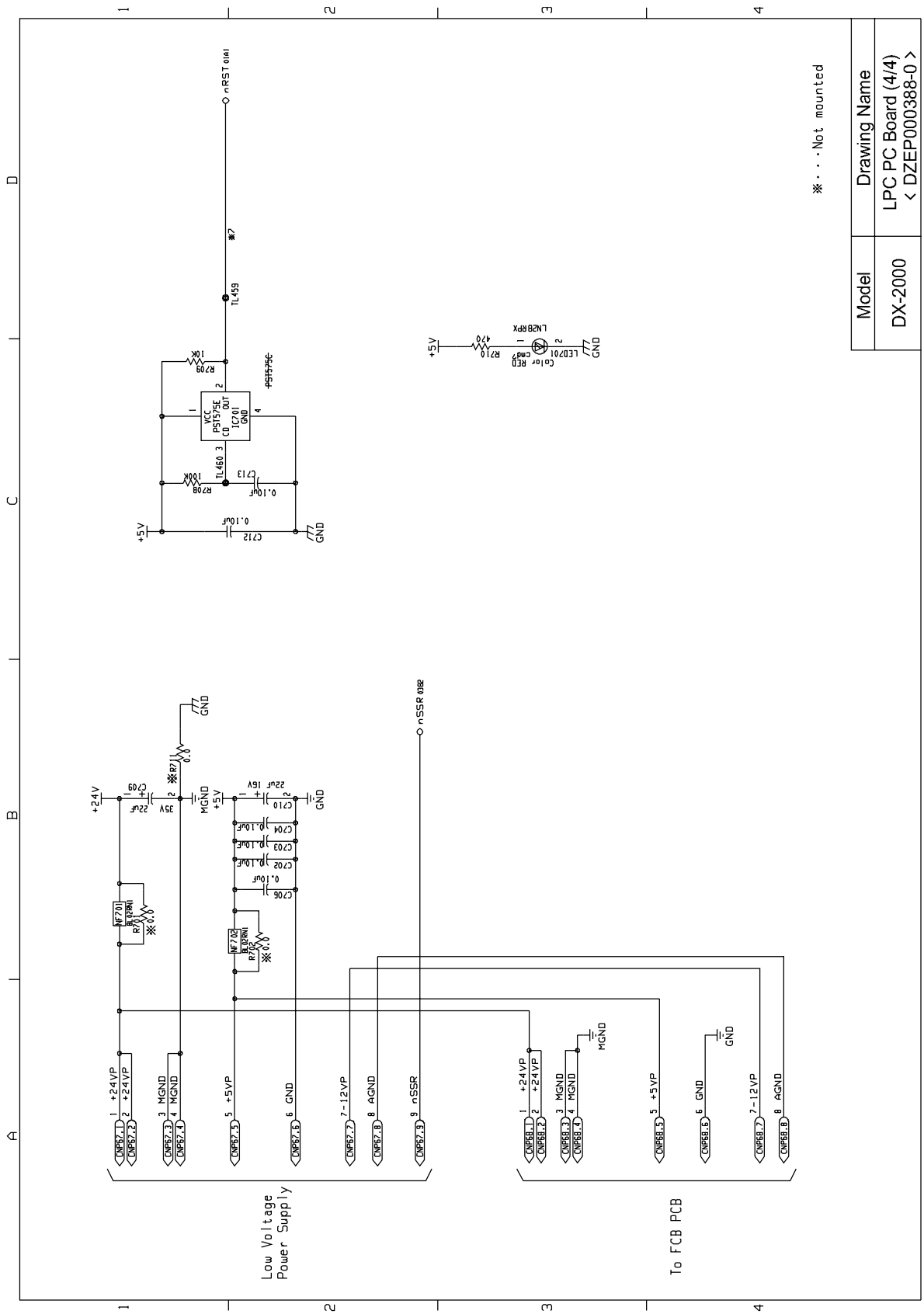




Model	Drawing Name
DX-2000	LPC PC Board (2/4)
	< DZEP000388-0 >



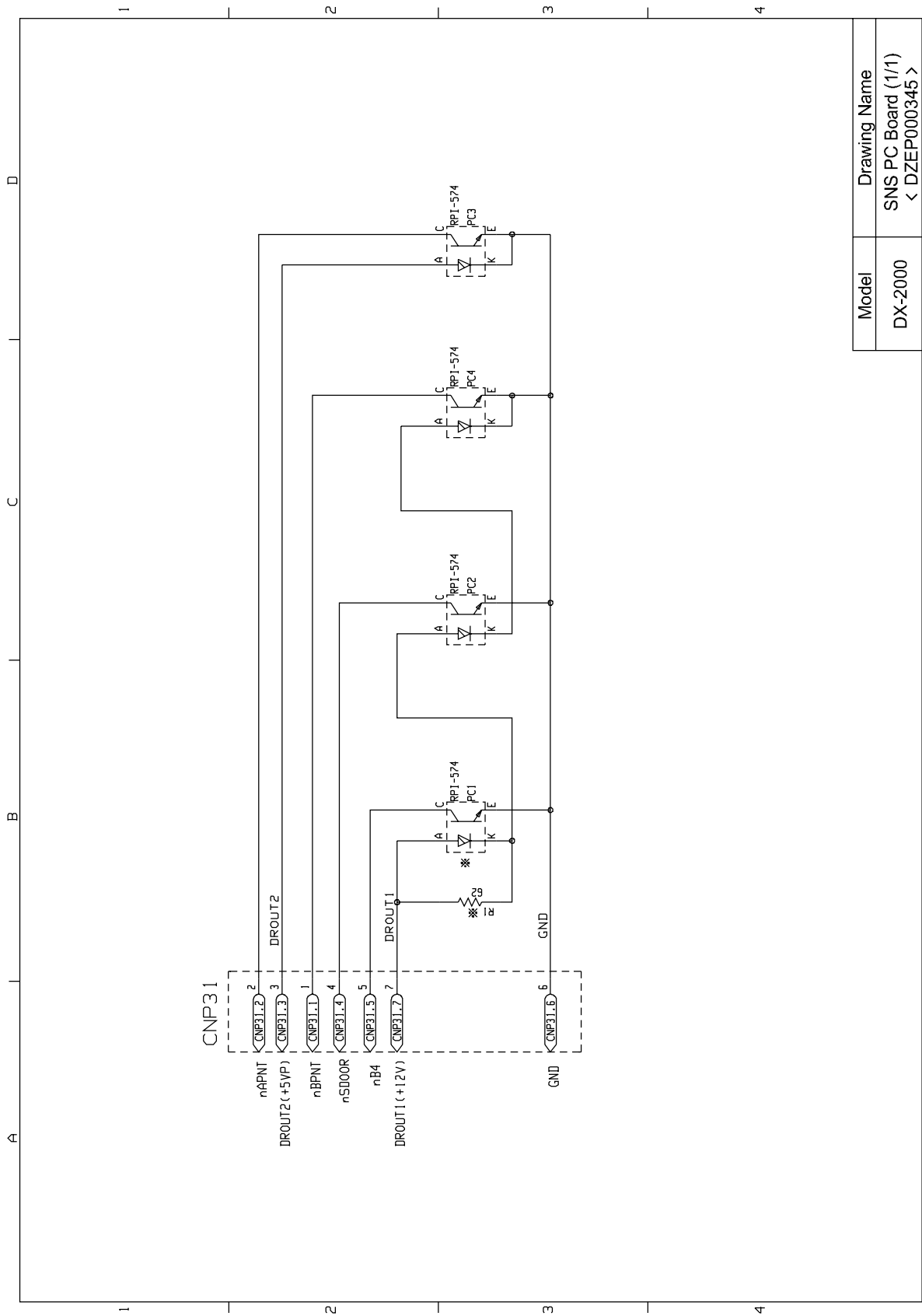
Model	Drawing Name
DX-2000	LPC PC Board (3/4)
	< DZEP000388-0 >



※...Not mounted

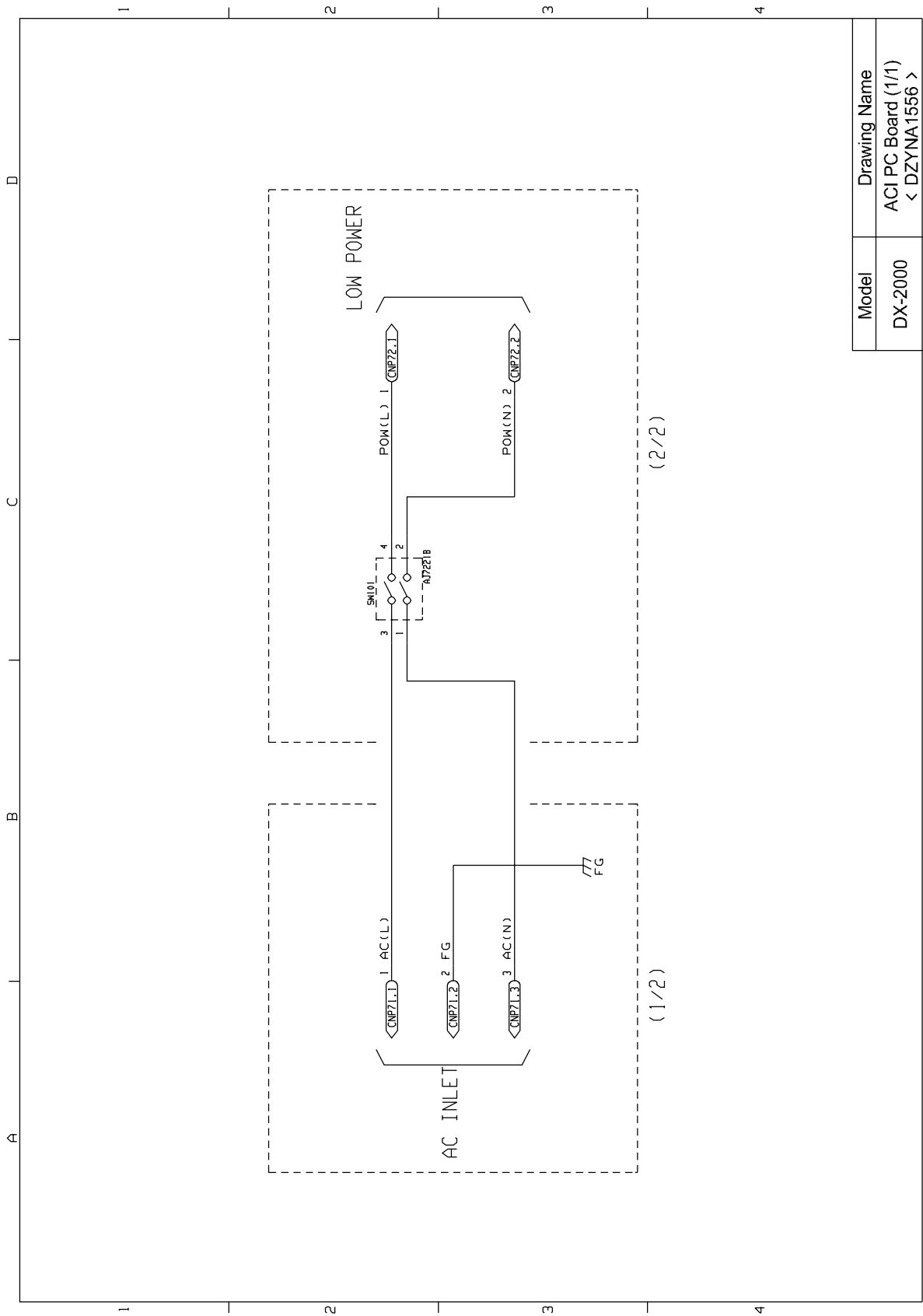
Model	Drawing Name
DX-2000	LPC PC Board (4/4) < DZEP000388-0 >

11.12. SNS PC Board



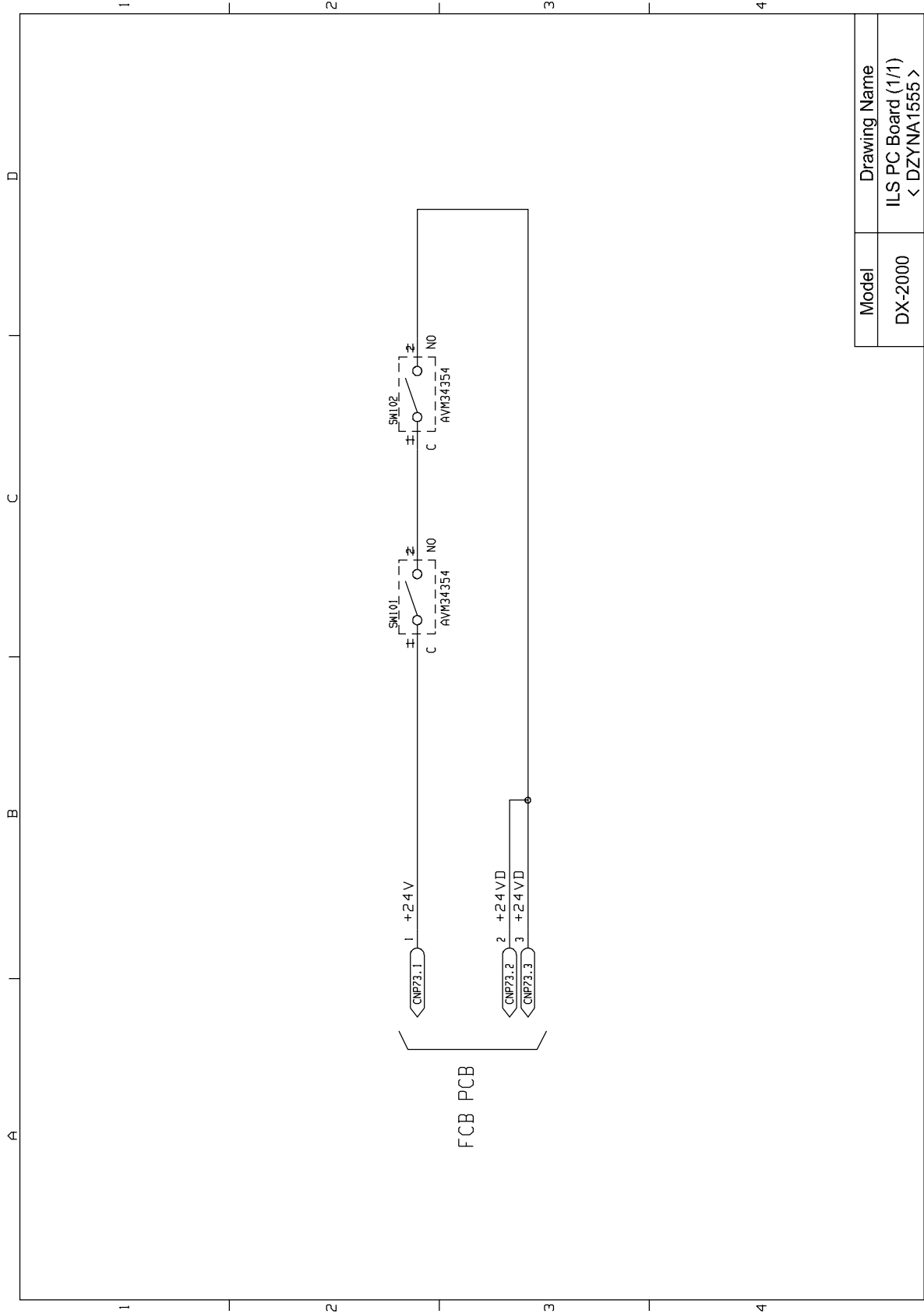
Model	Drawing Name
DX-2000	SNS PC Board (1/1) < DZEP000345 >

11.13. ACI PC Board

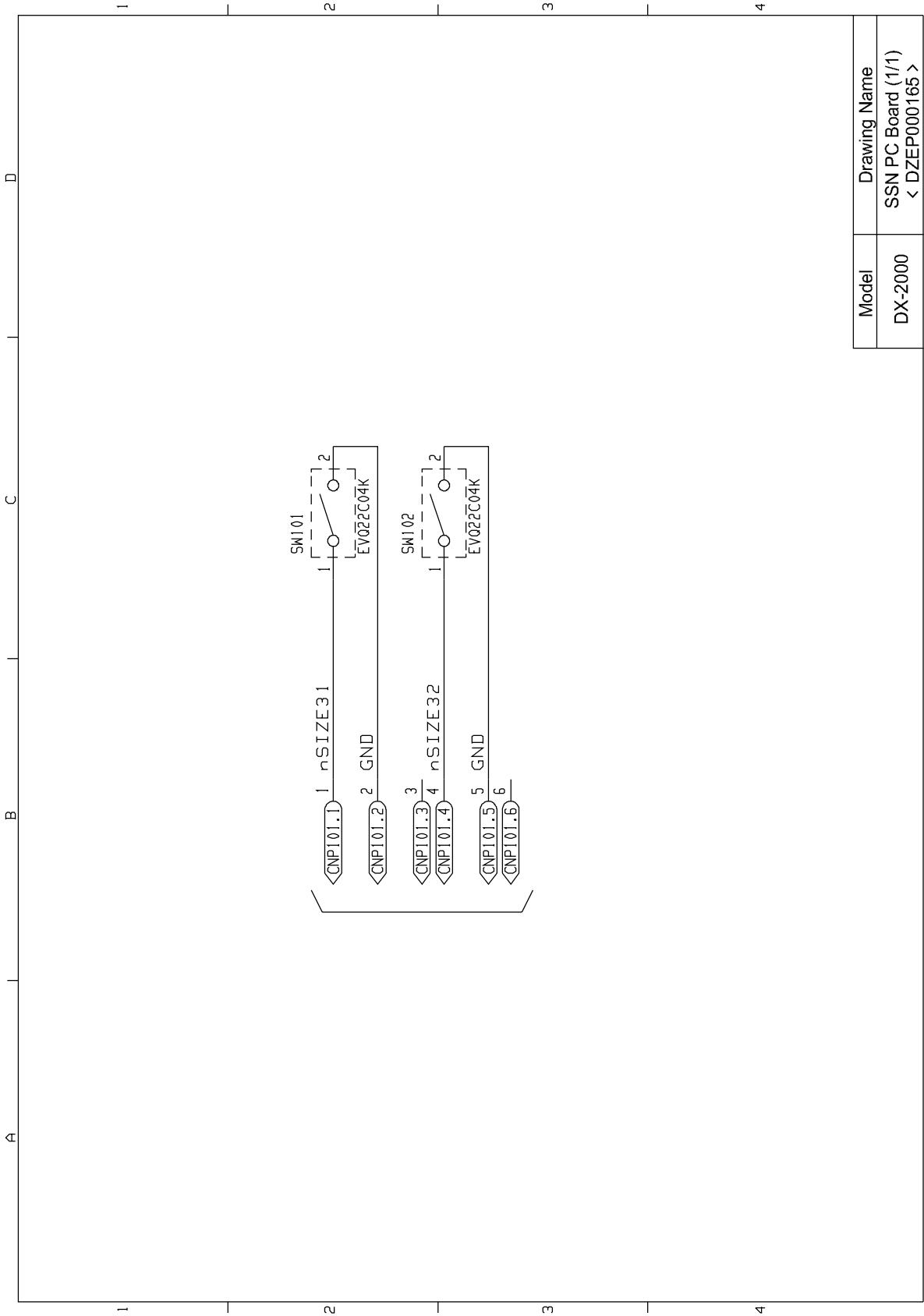


Model	Drawing Name
DX-2000	ACI PC Board (1/1) < DZYNA1556 >

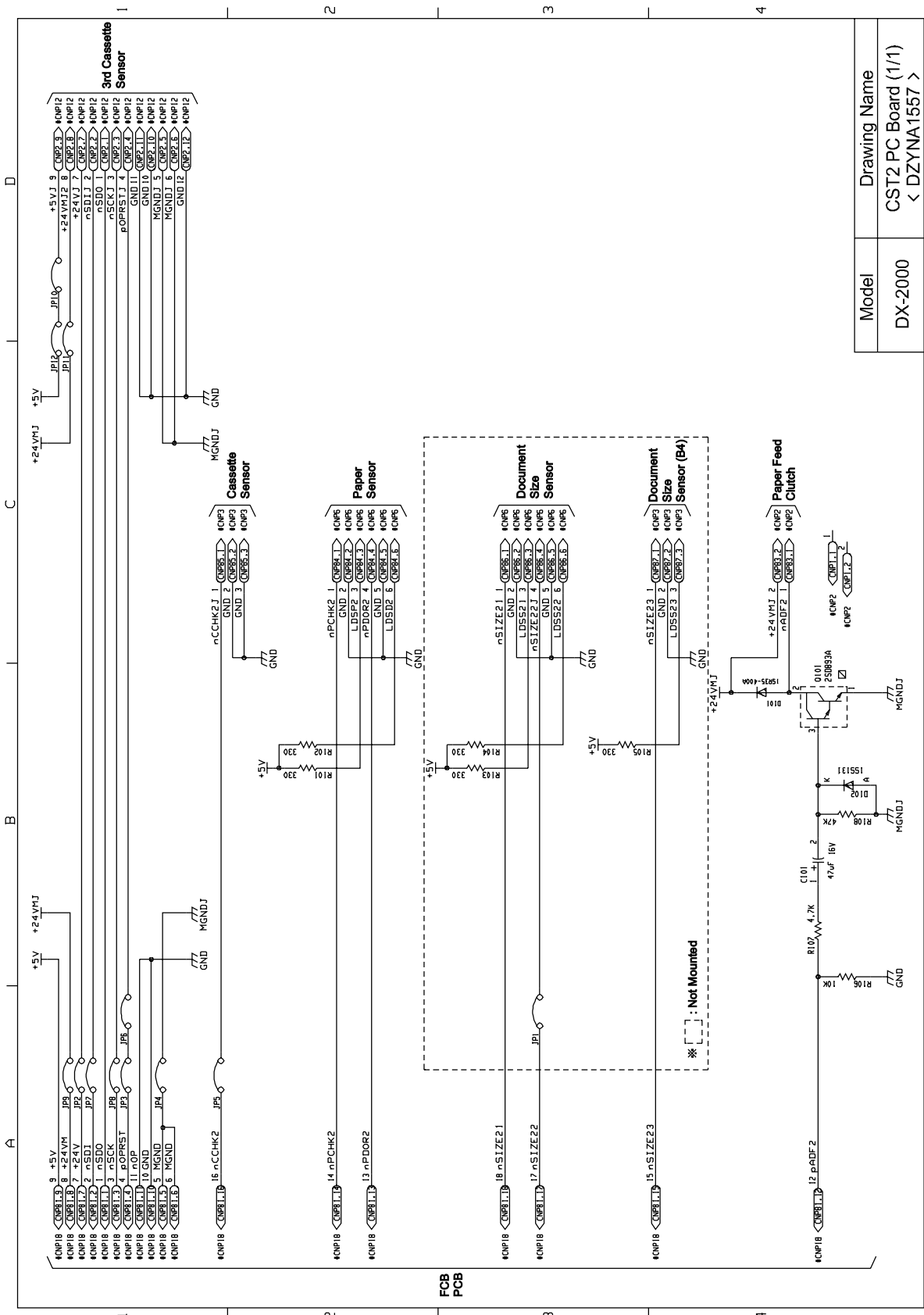
11.14. ILS PC Board



11.15. SSN PC Board

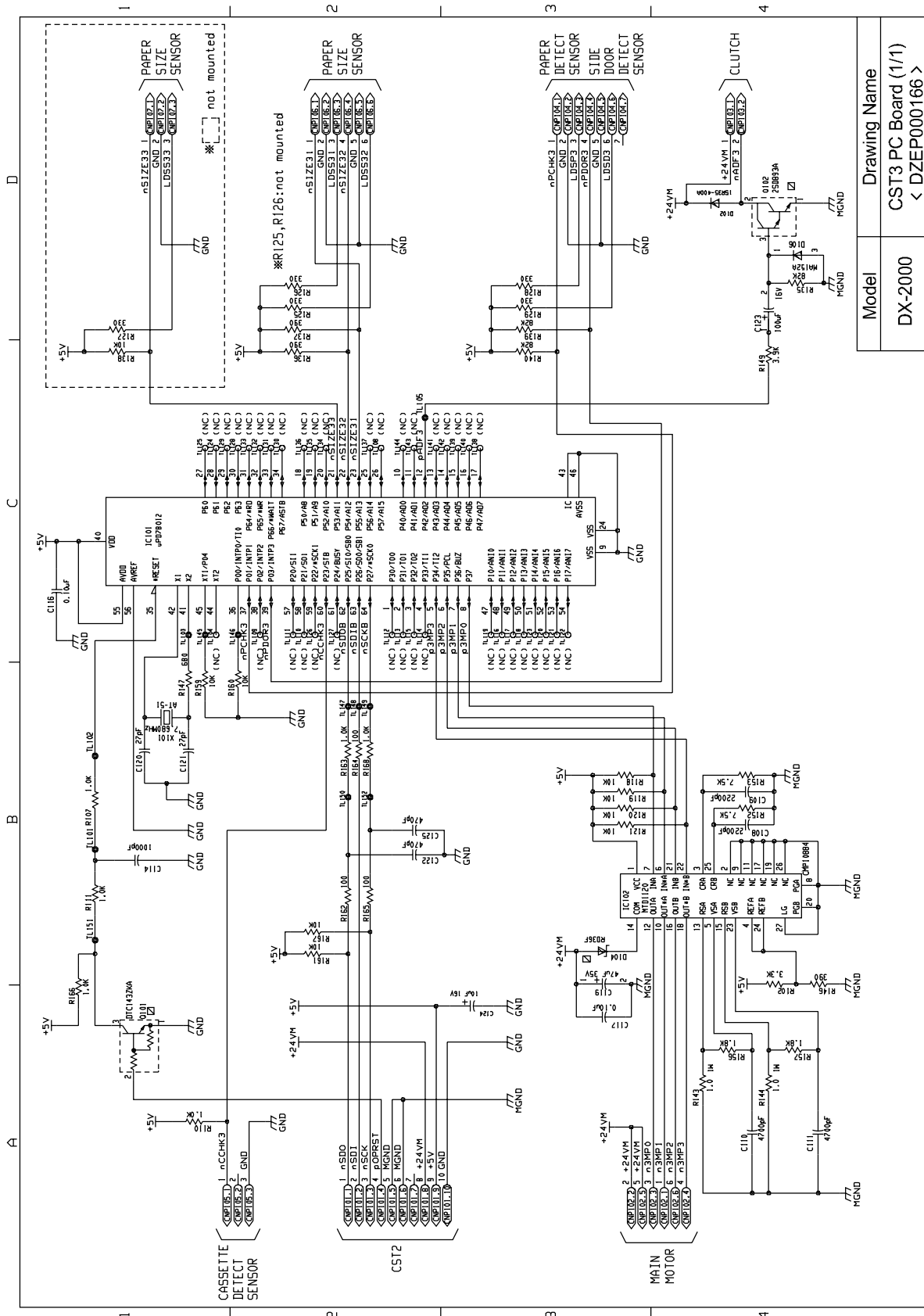


11.16. CST2 PC Board



Model	Drawing Name
DX-2000	CST2 PC Board (1/1) < DZYNA1557 >

11.17. CST3 PC Board



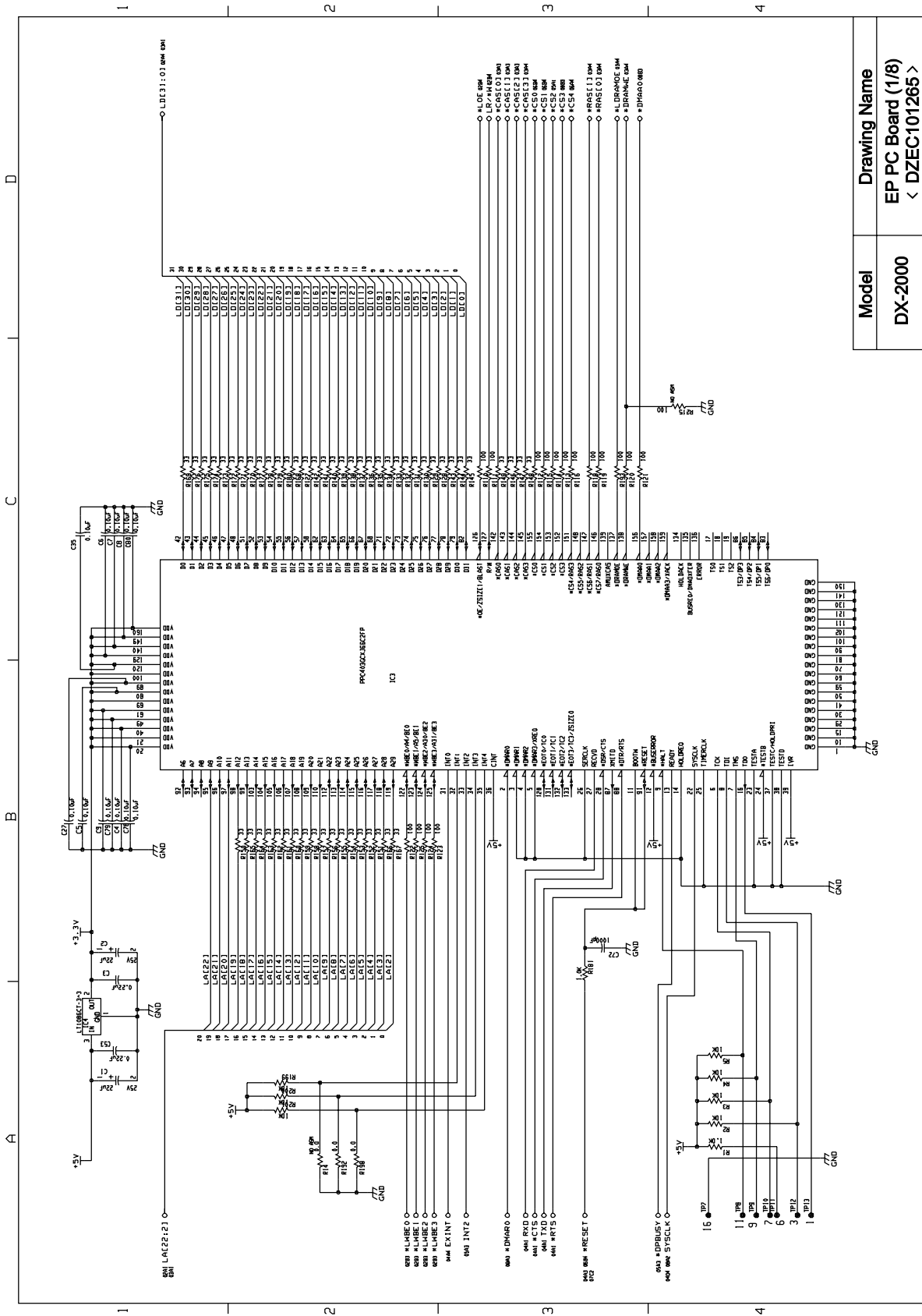
Drawing Name

CST3 PC Board (1/1)
< DZEP000166 >

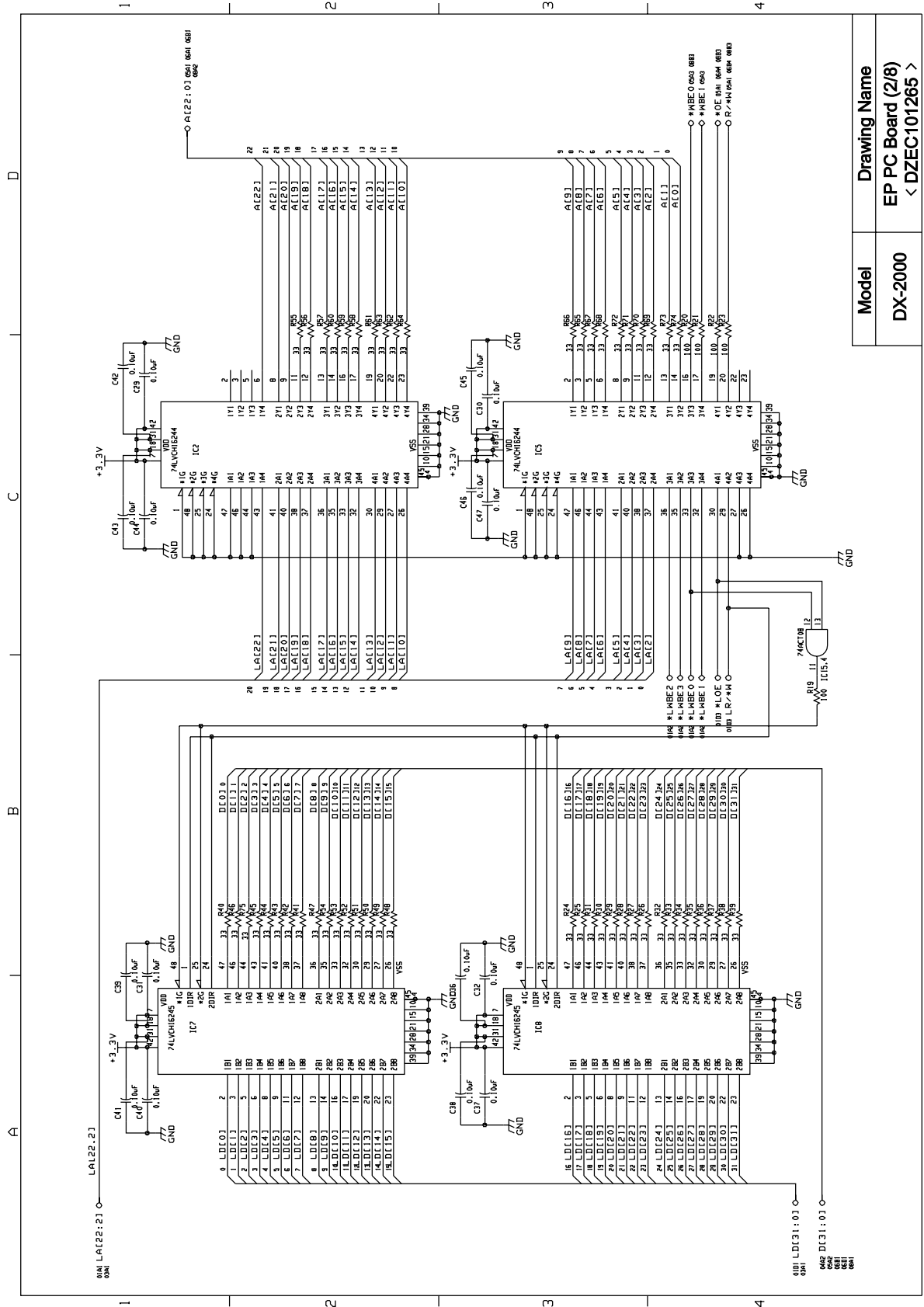
Model

DX-2000

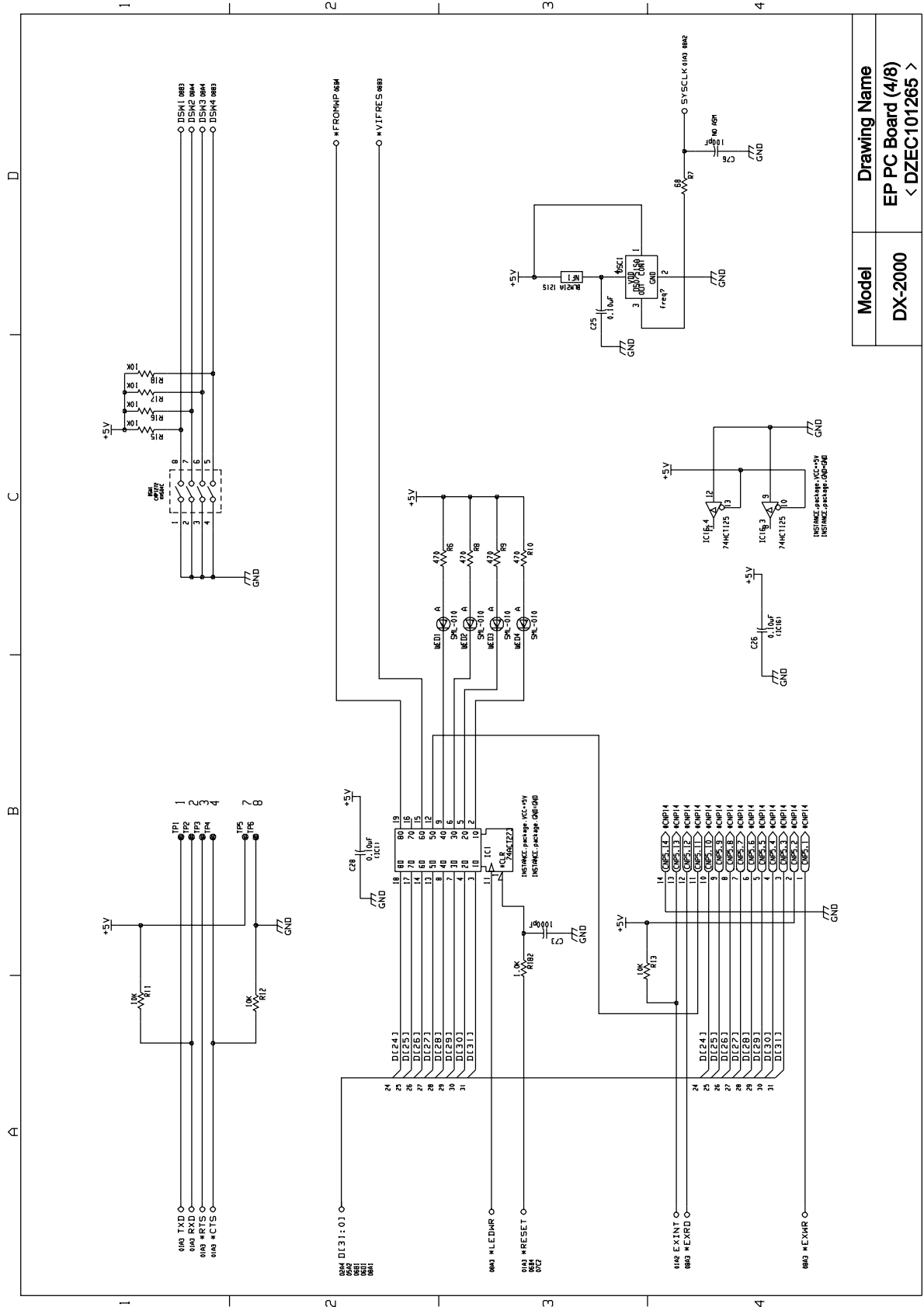
11.18. EP PC Board



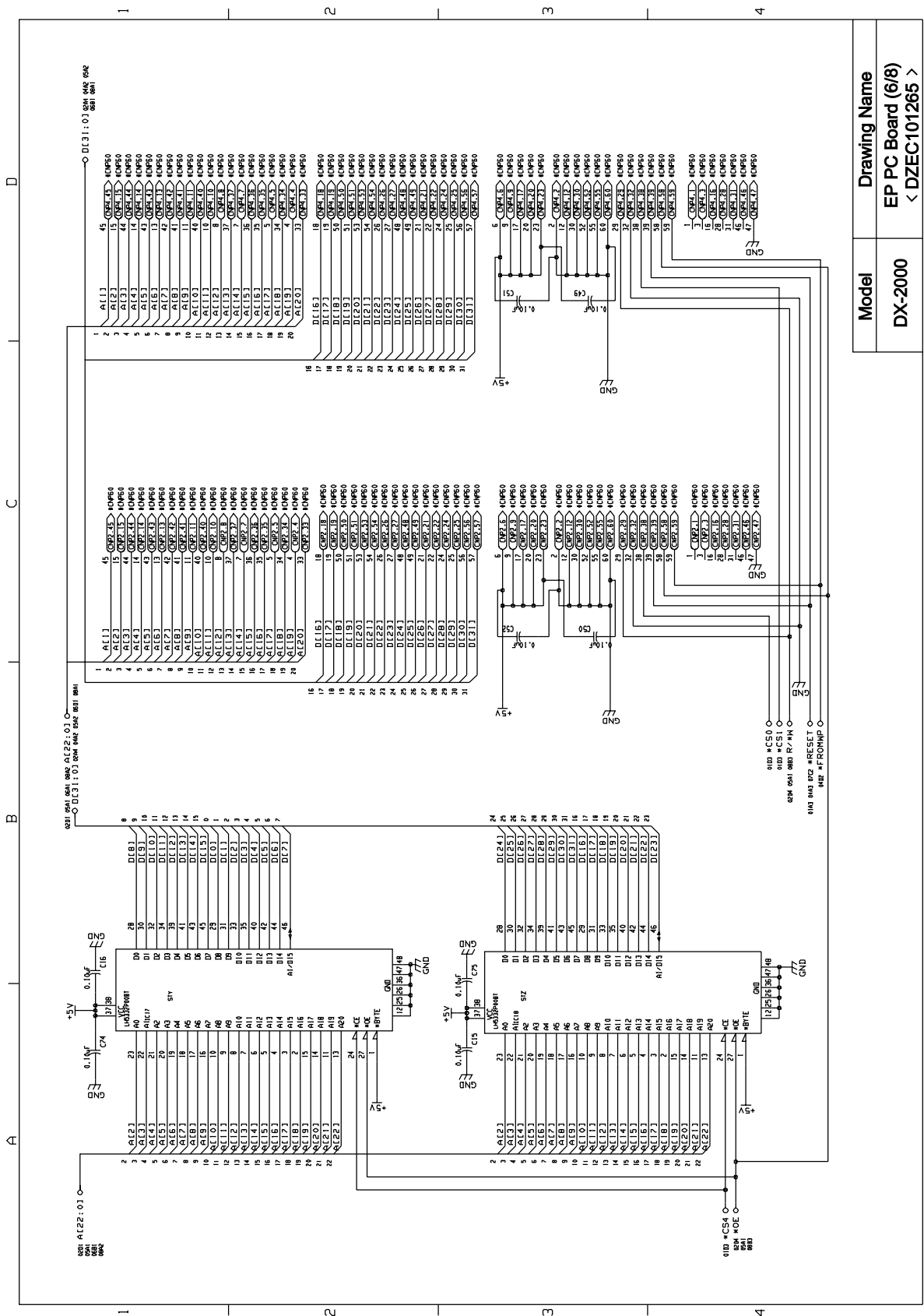
Model	Drawing Name
DX-2000	EP PC Board (1/8) < DZEC101265 >

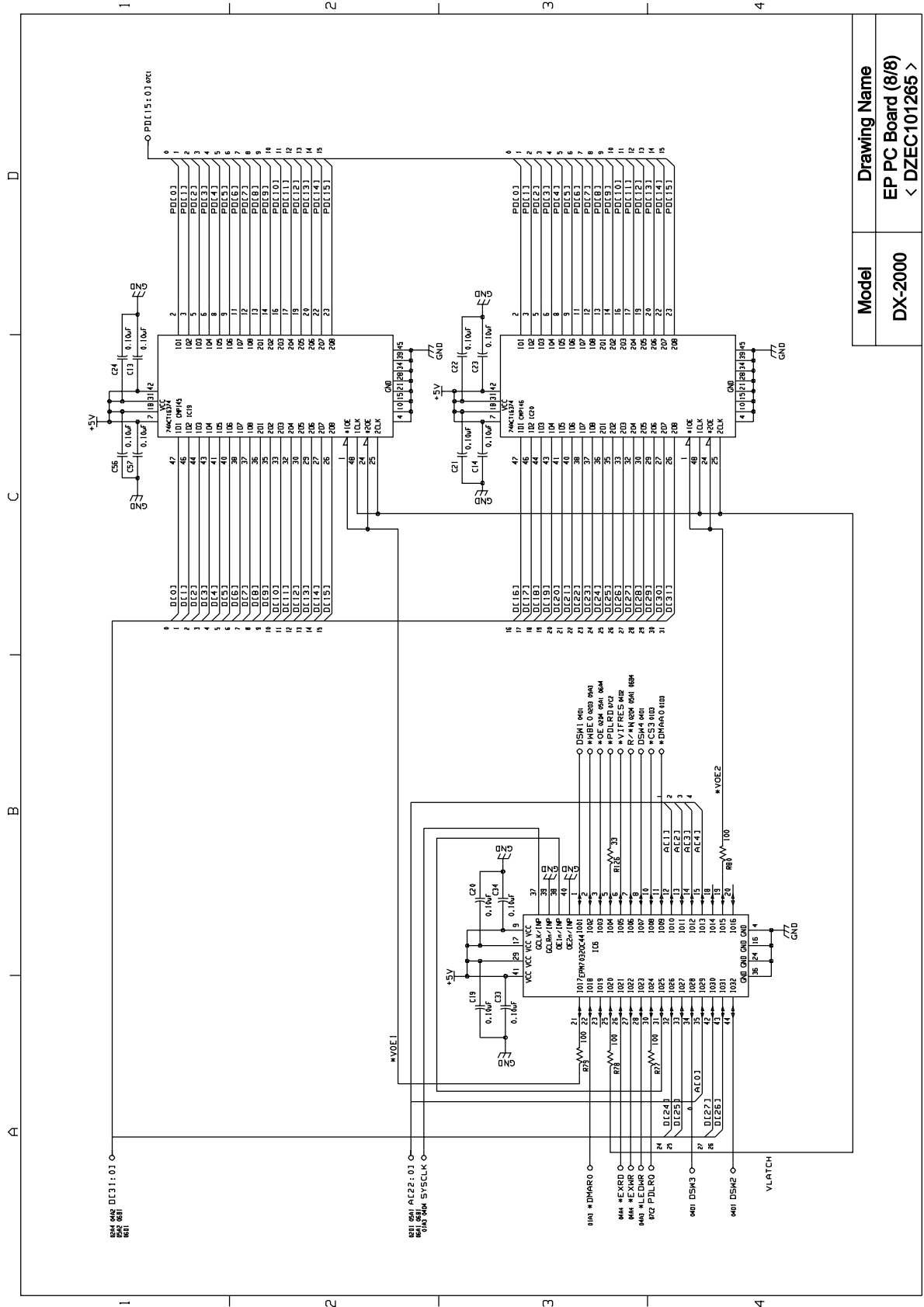


Model	Drawing Name
DX-2000	EP PC Board (2/8)
	< DZEC101265 >



Model	Drawing Name
DX-2000	EP PC Board (4/8)
	< DZEC101265 >





Model	Drawing Name
DX-2000	EP PC Board (8/8)
	< DZEC101265 >